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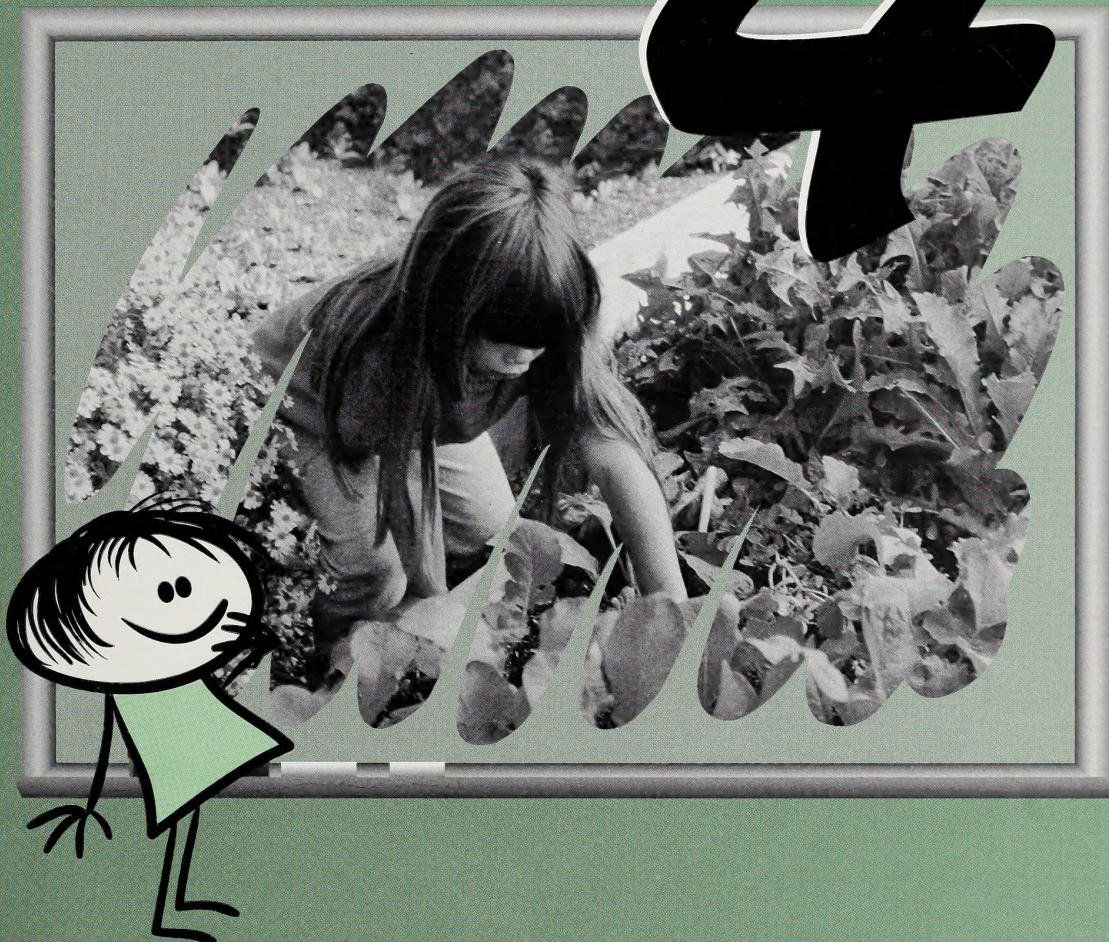


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Mathematics

Module 5

4




Multiplication



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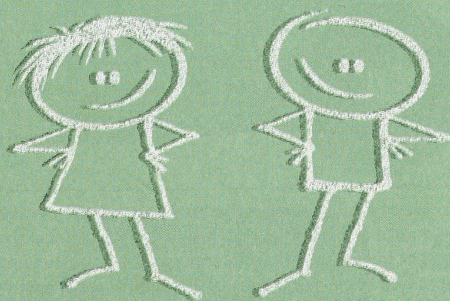


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Mathematics 4

Module 5 Multiplication



Learning
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Mathematics 4
Module 5: Multiplication
Student Module Booklet
Learning Technologies Branch
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This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	



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<http://www.learning.gov.ab.ca/ltb>

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Welcome!

Mathematics 4 contains nine modules. Work through the modules in the order given, since several concepts build on each other as you progress through the course.

Mathematics 4

Module 1
Data
Management

Module 2
Number Concepts
and Patterns

Module 3
Fractions
and Decimals

Module 4
Addition
and Subtraction

Module 5
Multiplication

Module 6
Division

Module 7
Measurement

Module 8
Exploring
Geometry

Module 9
Investigating
Outcomes

Icons



The book you are presently reading is called a Student Module Booklet. You will find icons used throughout it. Read the following explanations to find out what each icon tells you to do.



Pay close attention to important words or ideas.



Refer to the textbook *Quest 2000: Exploring Mathematics*.



Use manipulatives, cut-out learning aids, or pull-out pages.



Do an activity to review the concept.



Use a calculator.



Prepare to do a Challenge activity.



Do an activity just for fun!



Do an activity with your home instructor.



Use the Internet.



Use the Answer Key to Self-Marking Activities in the Appendix to correct activities.



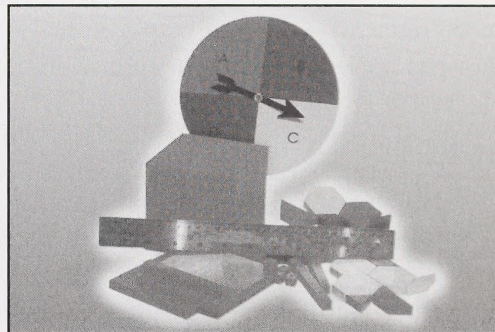


Information for the Student

The Grade 4 Mathematics course is designed to keep you actively involved in learning as you progress through the daily lessons in each of the nine modules. Besides the Student Module Booklets, you will also need a copy of the Grade 4 Mathematics textbook called *Quest 2000: Exploring Mathematics*. The textbook contains pictures, information, questions, and problems that are referred to in the modules. Each module also requires you to complete one or more Assignment Booklets to be sent to your teacher for marking.

Manipulatives

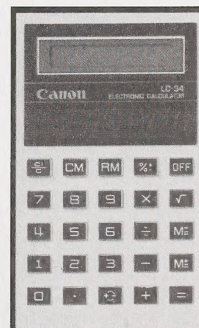
Manipulatives are hands-on materials that you will be using to help you learn new concepts and ideas. They include things like base ten blocks, geoboards, spinners, counters, polygon shapes, tiles, rulers, and metre-sticks. Don't worry if you don't have all of these manipulatives. Some can be found in the Cut-Out Learning Aids section of the Appendix in several of the modules. Some you may be asked to make from materials found in your own home. However, it is highly recommended that you have a set of base ten blocks. They will be used often to help you to understand many new math concepts.



You should use manipulatives whenever you think they will help you understand something new you are learning. Manipulatives can also be useful when you are sharing or discussing what you know with your home instructor.

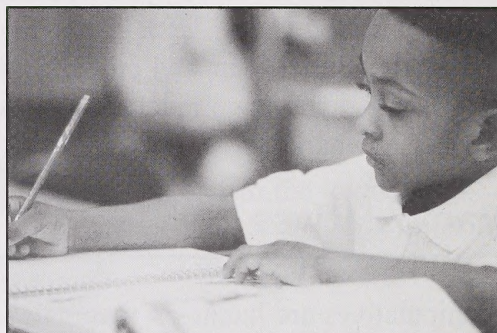
Calculators

You will need a calculator for many of the activities in Mathematics 4. It is important to remember that a calculator is a tool to be used when doing difficult calculations and when investigating what numbers can do. Don't rely on the calculator for calculations that you can do in your head. For example, you would not use a calculator when estimating or doing mental math. Both of these activities rely upon mastering the basic number facts.



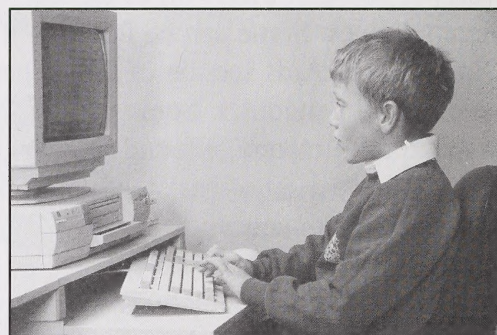
Basic Number Facts

You will practise the basic facts on several days of each module. Each drill is timed to encourage you to work quickly. At first, you may not do very well because you may not know all of the number facts yet, or you may have forgotten some of the number facts you learned last year. Don't worry. By practising the facts regularly, your scores will improve over time. Strategies to help you learn the number facts will be presented in the lessons.



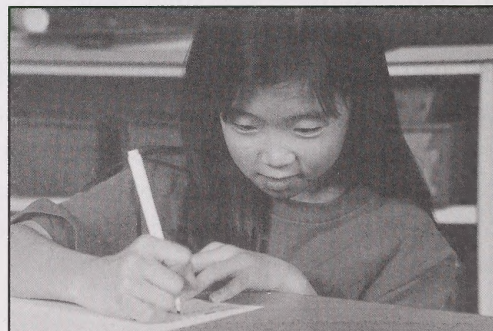
Computers

If you have your own computer at home, you may already know some computer software programs that help you to learn mathematics. There are also many websites on the Internet that provide math activities for students to do. Throughout this course, you will find optional activities that refer to software programs and Internet websites. You should do these activities only when you have finished the daily assigned work. **Note:** Always check with your home instructor before you log onto the Internet. **Remember that any Internet website address given in this module is subject to change.**



Journal Writing

In each Assignment Booklet, you will often be asked to complete a journal entry about something you have been learning in the module. Being able to put into your own words what you have learned is an important skill. It will help you think about what you know as well as help your teacher understand your thinking.

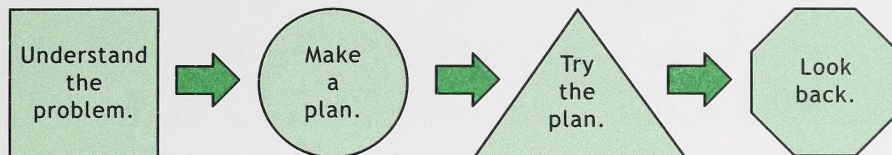




Problem-Solving Skills

You are already familiar with problem solving from earlier grades. This course will continue to help you develop strategies to make you a better problem solver. There are four steps that can be used to solve most problems.

The Four-Step Process



Step 1

Understand
the
problem.

In this step, you need to spend time reading over the problem in order to understand what you are being asked to find. One way to see if you understand the problem is to cover it up and then try restating it in your own words. Sometimes it might seem like not enough information is given. If this happens, try asking yourself the question, “What do I already know that will help me solve this problem?”

Step 2

Make
a
plan.

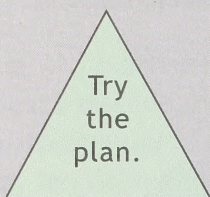
In this step, you decide on the method or strategy you will use to solve the problem. Different problems require different strategies. Most problems can be solved in more than one way. In this course, you will be looking at the following seven strategies:

- acting out the problem
- guessing and checking
- making an organized list
- drawing a diagram
- making a table or chart
- looking for a pattern
- making it simpler

You will be introduced to these strategies as you move through the modules. However, you may review each of the strategies at any time by turning to the Appendix of Module 1.

Remember, there is no one “right” way to solve a problem. The method or strategy you use may be different than the one your home instructor or someone else doing the problem would use. Sometimes you will find that more than one strategy on the list can be used to solve a problem. In fact, sometimes you may decide to invent a strategy of your own that is not even on the list.

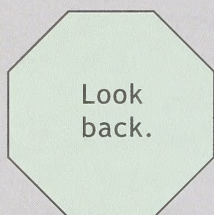
Step 3



In this step, you try out one of your strategies to see if it works to solve the problem. Don't worry if you can't find the answer immediately. Some problems take more than one step. You may also find it necessary to use your calculator to do some of the calculations.

Sometimes, as you try to solve the problem, you'll find that your strategy isn't working. Don't give up. Try another method instead.

Step 4



In this step, you take time to look at your answer and ask, "Is my answer reasonable? Does it make sense?" Writing your answer in a complete sentence may help you to see if, in fact, you have answered the question. If not, you may have to check your calculation for errors or, perhaps, try another strategy.

This is also a good time to look at the strategy you used and to think about how you could use it again in other problem-solving situations. Take time to share your strategies with your home instructor, and compare your method with the strategy your home instructor might use.



Remember, problem solving is a skill you need and will use throughout your life. The more practice you have with solving problems, the better your problem-solving skills become. Problems don't always have just one "right" answer. Some problems have several possible answers, just as some problems may be solved in several different ways.

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Overview

Module 5: Multiplication

Section 1:
Understanding Multiplication

Section 2:
Extending Your Multiplication Skills



Module 5: Multiplication

Suppose you are asked to quickly count the number of books in a shipment of new library books. There are several boxes of books to count.

Is there a fast way to find the total number of books? Yes! You can quickly find the total by multiplying!

In this module you will...

- learn what multiplication is and when to use it
- think about multiplication in different ways
- practise basic multiplication facts
- create your own multiplication problems
- multiply two- and three-digit numbers by one-digit numbers
- use estimation
- practise mental math skills
- learn a new problem-solving strategy



There are **two** Assignment Booklets for Module 5.

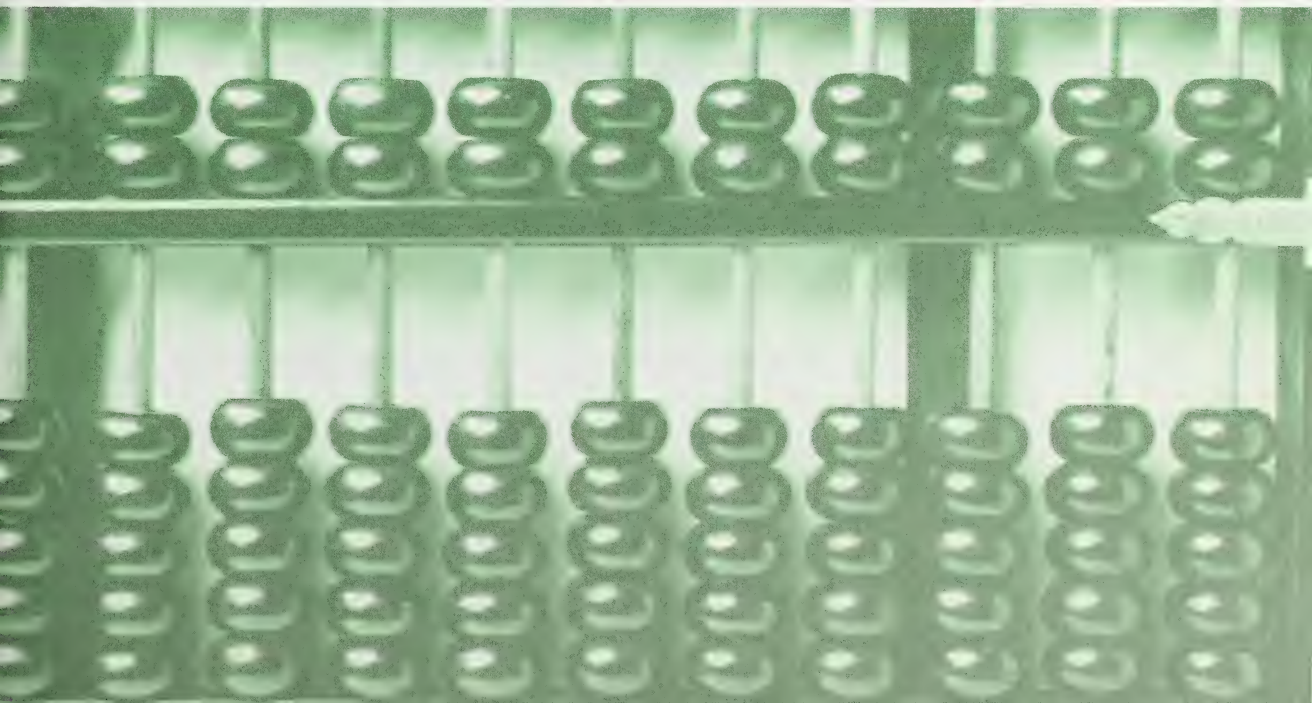
You should send in Assignment Booklet 5A after completing Day 11.

You should send in Assignment Booklet 5B after completing Day 20.



Section 1

Understanding Multiplication





Addition and Multiplication

There will be many times in your everyday life when you need to solve simple number problems. Often, you'll want to divide snacks evenly between you and your friends.

Example

Jack is having some friends over to watch a movie. He wants to have enough chips for everyone, so he bought 6 boxes of chips. Each box holds 3 bags of chips. How many bags of chips does Jack have?



First, choose an operation to help you find the solution to the problem.

You might use addition to help you solve.

Solve by **adding** 3 bags of chips 6 times.

$$3 + 3 + 3 + 3 + 3 + 3 = \mathbf{18} \text{ bags of chips}$$

There is another way to find the answer. Solve by **multiplying** 6 boxes by 3 bags in each box.

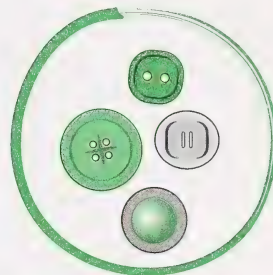
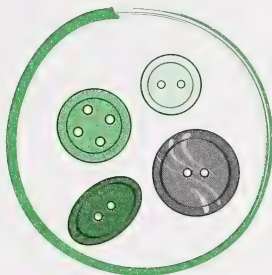
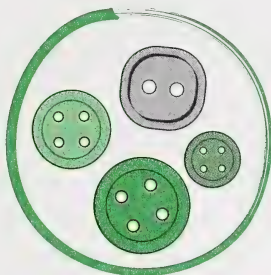
$$6 \times 3 = \mathbf{18} \text{ bags of chips}$$

The solution is the same whether you add or multiply. There are **18** bags of chips to serve to Jack's friends.



In this lesson, you will learn how multiplication and repeated addition are similar. Find some buttons, cereal, pennies, or other small objects that you can put into groups.

Make 3 groups of 4.



The **addition sentence** is $4 + 4 + 4 = 12$.

↑ ↑ ↑
3 groups of 4

The **multiplication sentence** is $3 \times 4 = 12$.

↑ ↑
3 groups of 4

You can see that both methods of solving tell you the same things:

- how many equal groups there are
- how many items are in each group
- the final total

$$3 \text{ groups of } 4 = 12$$



1. Use your manipulatives to make 7 groups of 3.
 - a. Draw the groups you made.

- b. Write an addition sentence for 7 groups of 3.

- c. Write a multiplication sentence for 7 groups of 3.



Check your answers in the Appendix.

2. Use your manipulatives to make 3 groups of 9.

- a. Write an addition sentence and a multiplication sentence for 3 groups of 9.

Addition sentence: _____

Multiplication sentence: _____

b. Draw the groups you made.



Check your answers in the Appendix.

3. Turn to page 93 of your textbook. Do questions 1 to 4 of On Your Own. Write an addition sentence and a multiplication sentence for each question.



Remember, the first number tells you the number of groups and the second number tells you how many are in each group.

On Your Own, Questions 1 to 4

1. How many juice boxes are there?

Addition sentence: _____

Multiplication sentence: _____

2. How many legs are there?

Addition sentence: _____

Multiplication sentence: _____

3. How many stamps are there?

Addition sentence: _____

Multiplication sentence: _____

4. How many toes are there?

Addition sentence: _____

Multiplication sentence: _____



Check your answers in the Appendix.

4. Thirsty Cola comes in packs of 6 bottles per pack. If you bought 7 packs, how many bottles would you have? Write an addition sentence and a multiplication sentence.

Addition sentence: _____

Multiplication sentence: _____

Check your answers in the Appendix.



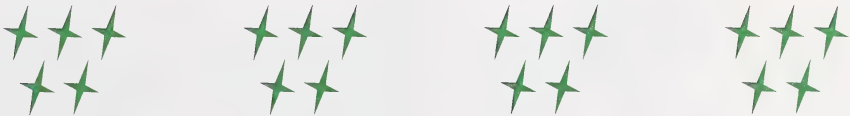
Multiplication Facts Chart

So far, you have found that to solve multiplication problems, it is helpful to draw a picture of the groups or use repeated addition.

Example

$$4 \times 5 =$$

You could draw a picture.



You could use repeated addition.

$$5 + 5 + 5 + 5 = 20$$

Solution: $4 \times 5 = 20$

However, drawing pictures and using repeated addition might take a long time. You need to solve some multiplication problems quickly.


A **multiplication facts** chart can help you solve some problems quickly.

It is very important to learn and remember the multiplication facts. You will be using these facts throughout your life!

There are many multiplication facts to learn. Using a multiplication facts chart may help you learn them quickly.

Here is an example of a completed multiplication facts chart.

Remember,
rows go across and
columns go down.



		Columns									
×	1	2	3	4	5	6	7	8	9	10	
1	1	2	3	4	5	6	7	8	9	10	
2	2	4	6	8	10	12	14	16	18	20	
3	3	6	9	12	15	18	21	24	27	30	
4	4	8	12	16	20	24	28	32	36	40	
5	5	10	15	20	25	30	35	40	45	50	
6	6	12	18	24	30	36	42	48	54	60	
7	7	14	21	28	35	42	49	56	63	70	
8	8	16	24	32	40	48	56	64	72	80	
9	9	18	27	36	45	54	63	72	81	90	
10	10	20	30	40	50	60	70	80	90	100	

On a multiplication facts chart, the numbers at the beginning of each row tell the number of groups. The numbers at the top of each column tell how many are in each group.

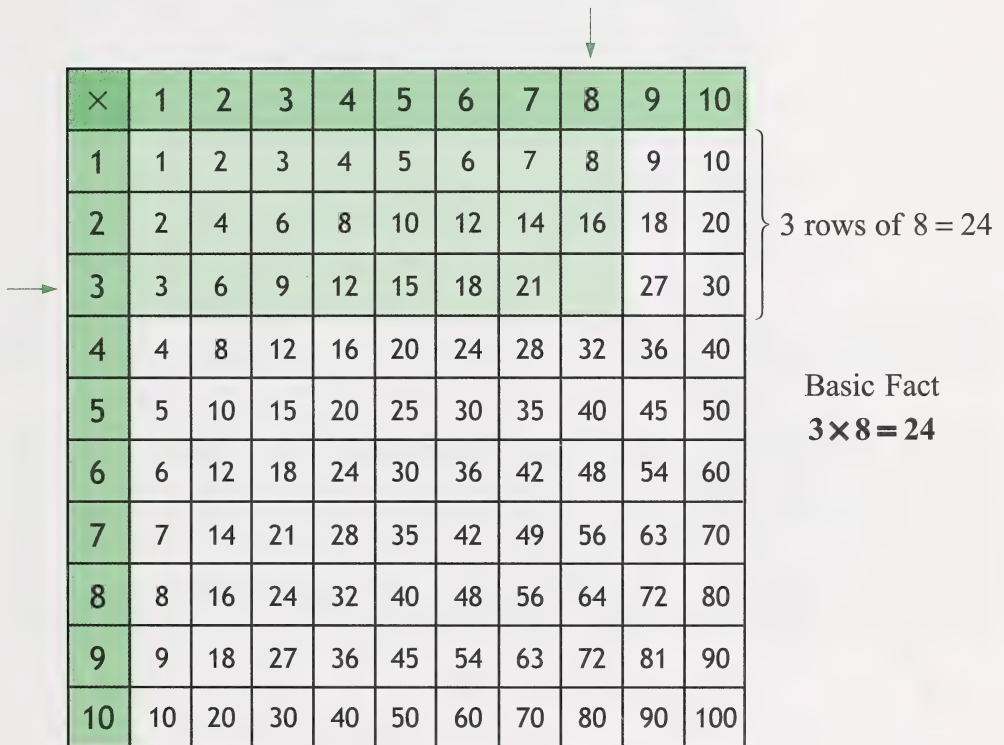
Example

Solve the multiplication problem $3 \times 8 =$.

Think of this as finding 3 groups of 8. Look at the row that begins with 3 on your chart.

Count 3 rows of 8 squares. The answer is **24**.

Write 24 in the square where the third row and the eighth column meet.



\times	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21		27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

3 rows of 8 = 24

Basic Fact
 $3 \times 8 = 24$

Example

Solve $5 \times 7 =$.

Think of this as finding 5 groups of 7. Use the multiplication facts chart to solve.

Look at the row that begins with 5 on your chart.

Count 5 rows of 7 squares. The answer is **35**.

Write 35 in the square where the fifth row and the seventh column meet.

↓

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30		40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56		70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

→

} 5 rows of 7 = 35

Basic Fact
 $5 \times 7 = 35$

5. Use the multiplication facts chart above to find the answer to $9 \times 7 =$.

Look at the row that begins with 9 on the chart. Count 9 rows of 7 squares.

Write your answer in the square where the ninth row and the seventh column meet.

What is the answer to 9×7 ? _____

Check your answers in the Appendix.





6. Find the Day 1: Multiplication Facts Chart in the Cut-Out Learning Aids section of the Appendix. Fill in all the squares on the chart.

Have your home instructor help you check all the answers on your chart.

7. Use your multiplication facts chart to complete each multiplication fact.

a. $2 \times 7 =$ _____

b. $8 \times 4 =$ _____

c. $9 \times 6 =$ _____

d. $7 \times 10 =$ _____

e. $10 \times 7 =$ _____

f. $8 \times 9 =$ _____

g. $6 \times 6 =$ _____

h. $9 \times 9 =$ _____

Post the chart in your study area and refer to it only when you need to.



Check your answers in the Appendix.



Check out this website to practise your basic facts!

<http://www.edu4kids.com/math>

This site, Flashcards for Kids, lets you practise number facts online.

Turn to Assignment Booklet 5A, and complete the activities for Day 1.





Understanding Multiplying

Factors and Products

In Day 1 you learned that equal groups are needed when you multiply. When you multiply 3×4 , you know there are 3 groups of 4.



The numbers multiplied together are called **factors**. The answer is called the **product**.

$$\begin{array}{ccccc} \text{Factor} & \longrightarrow & 3 \times 4 = 12 & \longleftarrow & \text{Product} \\ & & \uparrow & & \\ & & \text{Factor} & & \end{array}$$

1. In the sentence $6 \times 2 = 12$, name the product and factors.

- The number 6 is a _____.
- The number 2 is a _____.
- The number 12 is a _____.

Check your answers in the Appendix.

2. Write the word **product** or **factor** that names each circled number. An example has been done for you.

Example: $(9) \times 8 = 72$ **factor**

a. $3 \times (7) = 21$ _____



b. $(36) = 6 \times 6$ _____

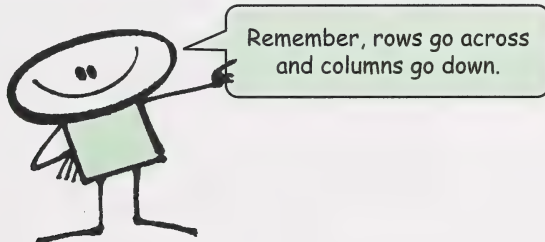
c. $7 \times 2 = (14)$ _____

d. $(4) \times 5 = 20$ _____



Check your answers in the Appendix.

Take out the multiplication facts chart that you made yesterday. With this chart you can easily see factors and products.



How much is 3×4 ?

To find the answer on your chart, look at the row that begins with 3. Then find the fourth column. The square where the third row and the fourth column meet is called the **product**. The product is 12. The **factors** are 3 and 4.

Use your multiplication facts chart for questions 3 and 4.

3. a. Tell how you would find the product of 4×5 .

b. What is the product of 4×5 ? _____

c. What are the factors? _____

4. a. Tell how you would find the product of 8×7 .

- b. What is the product of 8×7 ? _____

- c. What are the factors? _____



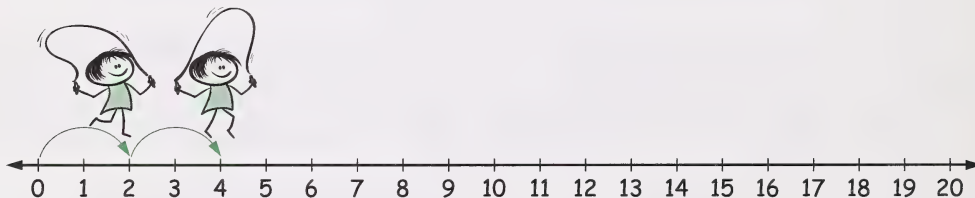
Check your answers in the Appendix.

Another Way to Think About Multiplication

You have learned to think of multiplication as repeated addition.

You can also think about multiplication as **skip counting**. Skip counting is one way to practise multiplication facts.

Look at the following number line and skip count by 2.



When you skip count by 2, you say the numbers

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

You add 2 to each number to get the next number.

You can also get these numbers by multiplying. Starting with 1, multiply each number on the number line by 2. You can see that skip counting by 2 and multiplying by 2 will give you the same numbers.

$1 \times 2 = 2$

$2 \times 2 = 4$

$3 \times 2 = 6$

$4 \times 2 = 8$

$5 \times 2 = 10$

$6 \times 2 = 12$

$7 \times 2 = 14$

$8 \times 2 = 16$

$9 \times 2 = 18$

$10 \times 2 = 20$

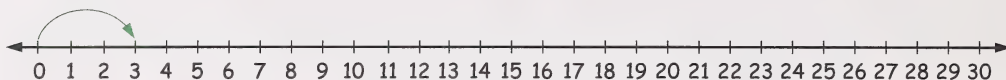
5. Complete the following table by skip counting by 2. Fill in the circles with the correct numbers and write the correct multiplication sentence beside each.

Skip Count	Multiplication Sentence
(2)	$1 \times 2 = 2$
(4)	$2 \times 2 = 4$
(6)	$3 \times 2 = 6$
(8)	$4 \times 2 = 8$
(10)	$5 \times 2 = 10$
()	_____
()	_____
()	_____
()	_____
()	_____

Check your answers in the Appendix.



6. a. Skip count by 3 to 30 using the number line. Begin at zero and mark each skip or count.



- b. What are you doing each time to find the next number?

- c. Write the skip count in the circles. Write the multiplication sentence for each count.

Skip Count	Multiplication Sentence
3	$1 \times 3 = 3$

Check your answers in the Appendix.



Skip Counting and the Multiplication Chart

Find your completed multiplication chart from Day 1. Put your finger at the beginning of the fourth row. (You should have your finger on the number 4.)

7. a. Write each number as you move your finger across the row from left to right. The first two numbers have been done for you.

4, 8, _____, _____, _____, _____, _____, _____, _____, _____

- b. Explain how the numbers increased as you moved across the row.

Check your answers in the Appendix.

8. Place your finger on the beginning of the fifth row.

- a. Write the numbers from left to right in the fifth row.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

- b. Explain what you noticed as you counted.

9. Place your finger on the beginning of the eighth row.

- a. Write the numbers from left to right in the eighth row.

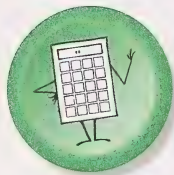
_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

- b. Explain what you noticed as you counted.

Check your answers in the Appendix.

Skip Counting on the Calculator

Repeated addition and skip counting are two ways to think about multiplication. Using a calculator is an easy way to show repeated addition and skip counting.



Find your calculator. Try this exercise.

10. If you have a “repeat” or “constant” function on your calculator, follow these steps:

- Press $\boxed{3}$ $\boxed{+}$ $\boxed{3}$.
- Then press the $\boxed{=}$ key.
- Write the number that appears in the display.
- Press the $\boxed{=}$ key four more times.

If you do not have the “repeat” or “constant” function on your calculator, you can still get the same answers. You will need to do this:

- Press $\boxed{3}$ $\boxed{+}$ $\boxed{3}$ $\boxed{=}$.
- Press $\boxed{+}$ $\boxed{3}$ $\boxed{=}$ four more times.



a. Write the number that appears each time you press the $\boxed{=}$ key.

3, _____, _____, _____, _____, _____

b. What is happening?



Check your answers in the Appendix.

Using the calculator is like repeated addition. Add five 3s together.

$$3 + 3 + 3 + 3 + 3 = 15$$

Using the calculator is like skip counting. The display shows the pattern

3, 6, 9, 12, 15

This problem can also be written as a multiplication sentence:

$$3 \times 5 = 15$$

The final result is the same for each method.

15

11. Press $\boxed{5}$ $\boxed{+}$ $\boxed{5}$ $\boxed{=}$. Press the $\boxed{=}$ key four more times (or use whichever method works with your calculator). Write the numbers you see on the display.

5, _____, _____, _____, _____, _____



Check your answers in the Appendix.

12. Press $\boxed{6}$ $\boxed{+}$ $\boxed{6}$ $\boxed{=}$. Press the $\boxed{=}$ key four more times (or use whichever method works with your calculator). Write the numbers you see on the display.

6, _____, _____, _____, _____, _____



Check your answers in the Appendix.

Special Factors

Multiplying by 2

What happens when you multiply a number by 2? Does it become **even** or **odd**? Does it make a difference if the number being multiplied is even or odd?

Remember! Even numbers end in 0, 2, 4, 6, or 8.
Odd numbers end in 1, 3, 5, 7, or 9.



13. a. When you start at 0 and skip count by 2, is each number even or odd? _____

b. Write a rule about multiplying an even number by 2.

Check your answers in the Appendix.

14. Do these multiplication facts as quickly as you can.

a. $2 \times 6 =$ b. $2 \times 4 =$ c. $2 \times 9 =$ d. $2 \times 5 =$

e. $2 \times 1 =$ f. $2 \times 7 =$ g. $2 \times 3 =$ h. $2 \times 0 =$

i. $2 \times 2 =$ j. $2 \times 8 =$

Check your answers in the Appendix.

Multiplying by 5

15. a. Skip count by 5 to 50. Write each skip count in the circles and then write the multiplication sentence for each count.

Skip Count	Multiplication Sentence
5	$1 \times 5 = 5$

- b. Put a circle around the last digit of each product. What do you notice? Can you see a **pattern**?

Check your answers in the Appendix.



Basic Number Facts Practice




Turn to the Number Facts Progress Chart for Module 5 in the Appendix. Remove the chart from the Appendix and hang it in your study area. You will use this chart to record your scores for the number facts drills in Module 5.

Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Multiplication Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

16. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 3 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

$2 \times 2 =$

$3 \times 9 =$

$8 \times 8 =$

$4 \times 9 =$

$7 \times 8 =$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$3 \times 5 =$

$7 \times 4 =$

$9 \times 2 =$

$6 \times 5 =$

$7 \times 2 =$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5A, and complete the activities for Day 2.





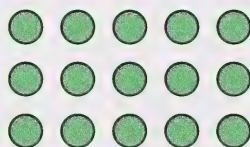
Arrays and Multiplying



Arrays

Today you will learn about **arrays**. You already know that you need equal groups in order to multiply.

For example, 3×5 could be shown as 3 equal groups of 5.



If objects are in rows and columns, the arrangement is called an **array**.



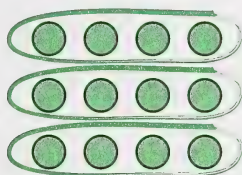
An **array** is a group of objects arranged in rows and columns.



Use your manipulatives (pennies, cubes, buttons, bread tags, etc.) to show 3×4 as an array. It could look like this.



When you draw an array, you can think of it in two ways:



3 groups of 4
 (3×4)

or



4 groups of 3
 (4×3)

You can also show 3×4 using the same array drawn in a different way. Use your manipulatives to make this array.



There are several ways to find the total number of objects in this array:



- Repeated addition: $4 + 4 + 4 = 12$ objects
- skip counting: 4, 8, 12 objects
- Multiplying: $3 \times 4 = 12$ objects

1. Make this array with your manipulatives. You should have 4 rows of 5 objects.



Show how you would find the total number of objects using the following methods.

- a. Repeated addition: _____
- b. Skip counting: _____
- c. Multiplication: _____



Check your answers in the Appendix.



2. Make an array with your manipulatives that has 3 rows of 6 objects.

a. Draw a picture of the array you made.

b. Show how you would find the total number of objects using the following methods.

• Repeated addition: _____

• Skip counting: _____

• Multiplication: _____



Check your answers in the Appendix.



3. Use your manipulatives to make the following arrays. Then draw a **picture** of each array. Write a **multiplication sentence** and a **repeated addition sentence** for each array.

a. 6 rows of 4

Addition sentence: _____

Multiplication sentence: _____

b. 3 rows of 9

Addition sentence: _____

Multiplication sentence: _____



Check your answers in the Appendix.

The Order Doesn't Matter!



Factors in multiplication sentences can be rearranged. The final product is still the same.

Look at this problem with Lucie and Tiger.

How many stars are there?



Lucie and Tiger think about this problem in two different ways.



Lucie and Tiger have two different multiplication sentences for the same array. Lucie used rows and Tiger used columns, but both have the same product.



Changing the order of the factors
does not change the product.



You know that $3 \times 5 = 15$ and $5 \times 3 = 15$. Therefore, $3 \times 5 = 5 \times 3$.

How many stars are there in the following array?



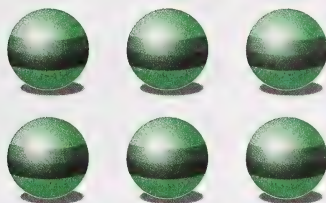
You might think of the array as showing 3 rows of 4 stars. You would write $3 \times 4 = 12$.

Or you might think of the array as showing 4 columns of 3 stars. Your multiplication sentence would be $4 \times 3 = 12$.

$$3 \times 4 = 4 \times 3$$

Notice that the order of the factors 3 and 4 does not matter. The product is still 12.

4. How many balls are in the following array? Write **three** multiplication sentences to show how you would solve this problem. (Show that the order of the factors does not matter.)



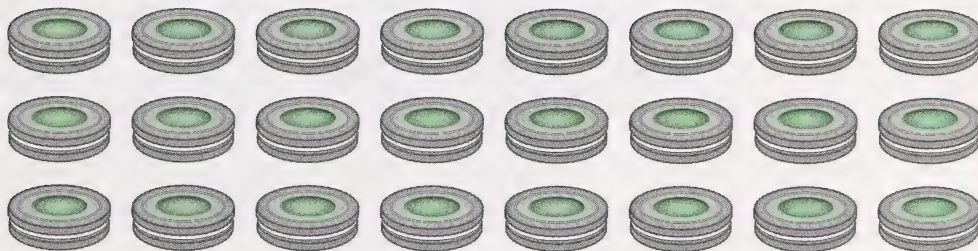
- _____
- _____
- _____



Check your answers in the Appendix.

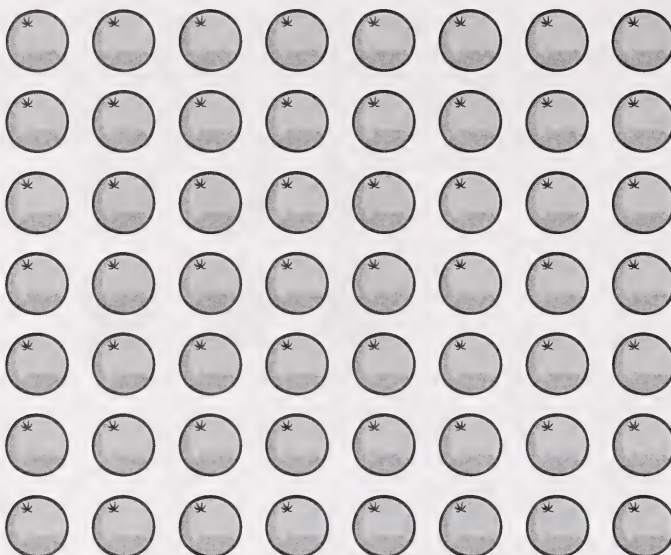
5. Write **three** multiplication sentences for each array. An example is done for you.

Example



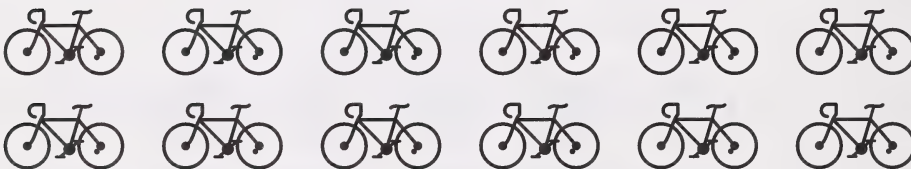
- $3 \times 8 = 24$
- $8 \times 3 = 24$
- $3 \times 8 = 8 \times 3$

a.



- _____
- _____
- _____

b.



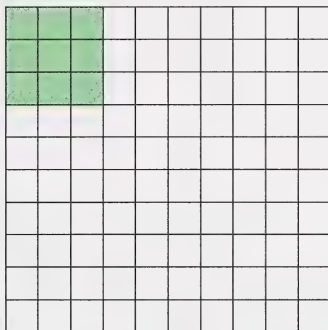
- _____
- _____
- _____

Check your answers in the Appendix.



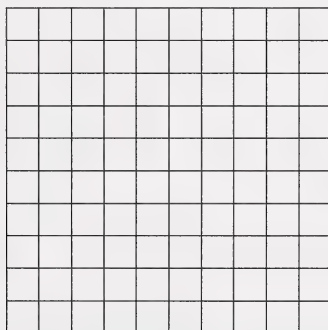
Arrays and Grids

Arrays can also be made using grids of squares. The shaded area of this grid shows an array of the multiplication sentence $3 \times 3 = 9$.

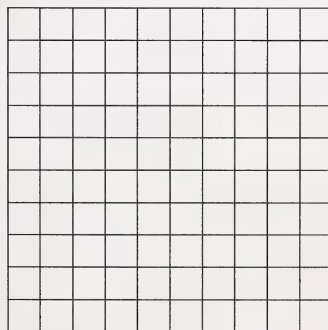


6. Shade in the squares to show an array for each multiplication sentence.

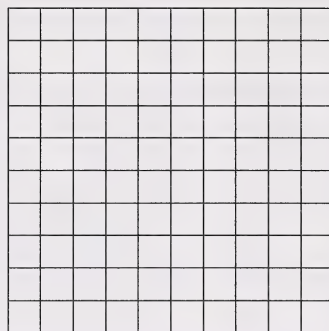
a. $5 \times 4 =$



b. $7 \times 5 =$



c. $2 \times 9 =$



Check your answers in the Appendix.



Mental Math



Special Factors

Mental math skills help you calculate answers to math questions in your head. A pencil isn't needed. Neither is a calculator. Knowing the rules and strategies that apply to certain special numbers will help you improve your mental math skills.

Multiplying by Zero

The product of zero and any number is zero.

Examples

$$0 \times 3 = 0$$

$$0 \times 39 = 0$$

$$0 \times 18 = 0$$



7. What happens when you multiply $3 \times 0 =$? Will the answer still be zero? Explain.



Use a calculator to check that 0×9 has the same value as 9×0 .

Any number times zero equals zero.



8. Calculate these answers in your head.

a. $0 \times 7 =$ _____

b. $4 \times 0 =$ _____

c. $0 \times 67 =$ _____

d. $99 \times 0 =$ _____



Check your answers in the Appendix.

Multiplying by 1

Look at this picture. There is one group of four stars. The multiplication sentence is $1 \times 4 = 4$.



9. What would happen if you had four groups of 1? Draw the picture and write the multiplication sentence.

Multiplication sentence: _____

10. In each picture there is one group of objects. Write the multiplication sentence for each.

a.



b.



c.



Check your answers in the Appendix.

The product of 1 and any number is that number.

11. Do these questions and use your calculator to check your answers.



a. $5 \times 1 =$ _____

b. $1 \times 8 =$ _____

c. $1 \times 1 =$ _____

d. $26 \times 1 =$ _____

Remember: If you reverse the order of the factors, the product remains the same.

$$7 \times 1 = 7$$

$$1 \times 7 = 7$$



Just For Fun



Array Art

You may need your home instructor to help you with this activity.

Collect these items:

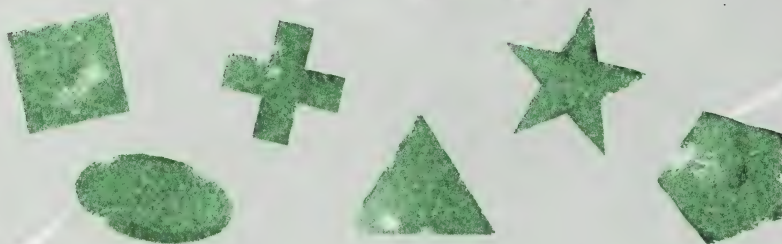
- kitchen sponges to make stamp shapes (**Note:** Other household items may also be used to make printing stamps—potatoes, small scraps of wood, etc.)
- poster paint
- crayons
- shallow dishes for paint
- newspapers
- large pieces of construction paper
- painting smock (optional)

Instructions:

Make your stamp! If you are using sponges, cut them into simple shapes like stars, triangles, squares, or ovals.

If you are using a potato, cut the potato in half and then carve around the outside of a simple shape in the cut end. Make sure that your print end is cut flat. A rough or uneven surface will not make a good stamp.

If you are using wood scraps, choose small pieces that have an interesting shape on one flat side.



Spread old newspapers over your work area. Mix your paint and pour a small amount into the paint dish.

Choose several multiplication facts. Think about all the possible arrays for each fact.

Dip your stamp into the paint. Wipe off any extra paint before stamping your print onto the paper. Make an array for each fact, stamping carefully on the paper.



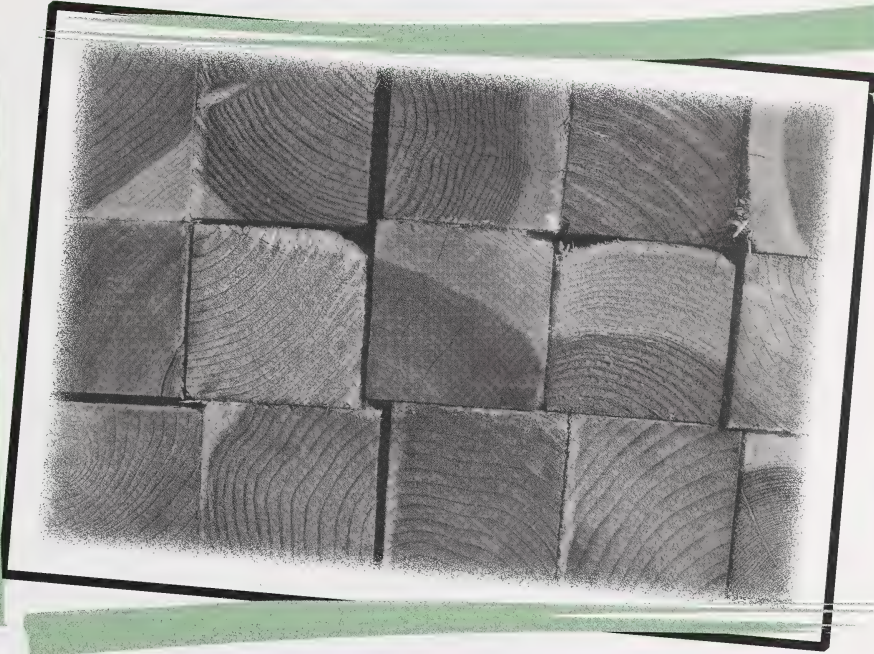
$$3 \times 5 = 15$$

Use crayon to print the multiplication sentence for the array.

Turn to Assignment Booklet 5A, and complete the activities for Day 3.



Different Arrays, Same Product



In Day 3 you learned that an array is a group of objects arranged in rows and columns. Today you will learn about making different arrays that have the same product.

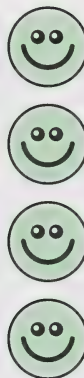
Example

Tiger had four happy faces. He made an array by putting them in one row on a piece of paper.



He wrote a multiplication sentence for his array: $1 \times 4 = 4$.

Tiger wondered if he could make any other arrays with his happy faces. He moved the faces around until he had this new array.



Instead of one row of 4, he saw four rows of 1. He wrote the multiplication sentence for this array: $4 \times 1 = 4$.

Tiger knew that $1 \times 4 = 4 \times 1$.

The two arrays showed that changing the order of the factors does not change the product.



Tiger decided to make arrays with six happy faces. Use your manipulatives to show what Tiger did with six happy faces.

He made one row and wrote a multiplication sentence.



$$1 \times 6 = 6$$

Then he moved the happy faces to form a new array.



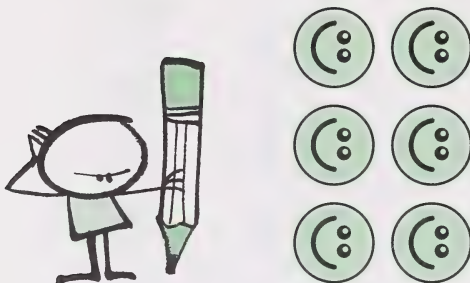
He wrote the multiplication sentence $6 \times 1 = 6$. Tiger knew that these two arrays were related because $1 \times 6 = 6 \times 1$.

Tiger then rearranged his happy faces into two rows. Use your manipulatives to make the array that he made.



He wrote a multiplication sentence for this array: $2 \times 3 = 6$.

Tiger noticed that instead of moving the faces, he could make a new array by turning his paper sideways. The new array looked like this.



Instead of two rows of 3, he now saw three rows of 2. He wrote $3 \times 2 = 6$.

Tiger made some more arrays with his happy faces. The products were the same.



1. Try making different arrays for the product 12. You will need 12 manipulatives (pennies, beads, buttons, bread tags, etc.).
 - a. Arrange your manipulatives in an array with one row. Draw the array.

- b. Write the multiplication sentence for the array. _____

- c. Turn your paper sideways and look at the array again. Draw this new array.

- d. Write the multiplication sentence for this array. _____

- e. Fill in the blanks of this **arithmetic sentence** to show that the arrays are related.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$$

Check your answers in the Appendix.



2. a. Rearrange your manipulatives into two equal rows. Draw the array.

b. Write the multiplication sentence for this array. _____

c. Turn your paper sideways and look at the array again. Draw the new array that you see.

d. Write the multiplication sentence for this array. _____

e. Write an arithmetic sentence to show that these arrays are related.

3. a. Rearrange your manipulatives into three equal rows. Draw the array.

b. Write the multiplication sentence for this array. _____

c. Turn your paper sideways and draw this new array.

d. Write a multiplication sentence for this array. _____

e. Write the arithmetic sentence that shows that these two arrays are related.

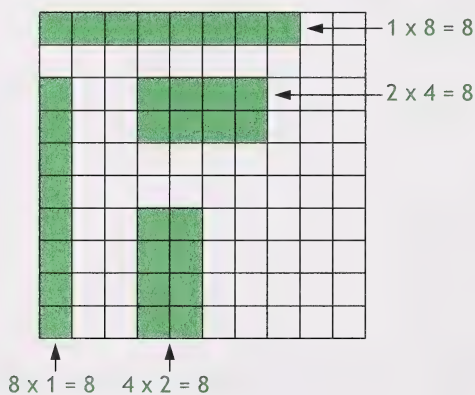
Check your answers in the Appendix.



Different arrays for the same product can be shown on a grid of squares.

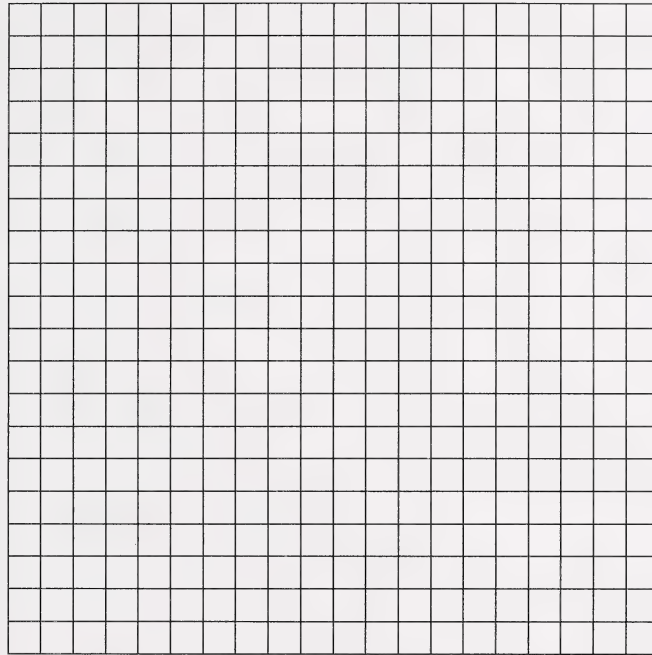


Look at this example for the product of 8. All arrays show a product of 8.



For questions 4 and 5, you will need about 70 coloured tiles. If you do not have real tiles, you may use the cut-out tiles found in Day 4 of the Cut-Out Learning Aids section of the Appendix.

4. a. Build arrays that use 15 tiles. Try to complete **four** different arrays. After building each array, draw it on the grid. Then colour the squares that form each array.



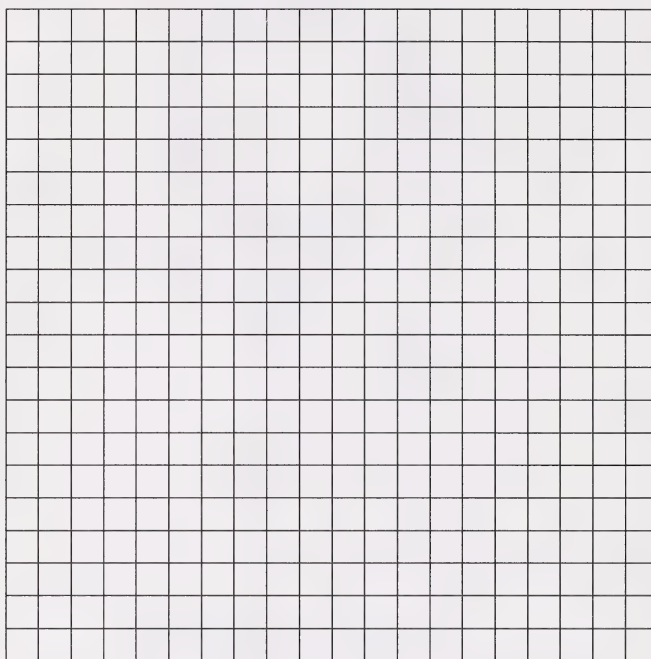
- b. Write a multiplication sentence for each array that you made.

- _____
- _____
- _____
- _____



Check your answers in the Appendix.

5. a. Make arrays for a product of 20. Use your tiles to make as many arrays as you can that use 20 tiles. You will have several arrays. Draw and colour each array on the grid.



- b. Write a multiplication sentence for each array that you made.

- _____
- _____
- _____
- _____
- _____
- _____



Check your answers in the Appendix.

Learning the Multiplication Facts

Squares

When a number is multiplied by itself, the product is called a **square number**.

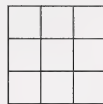
$$1 \times 1 = 1$$



$$2 \times 2 = 4$$



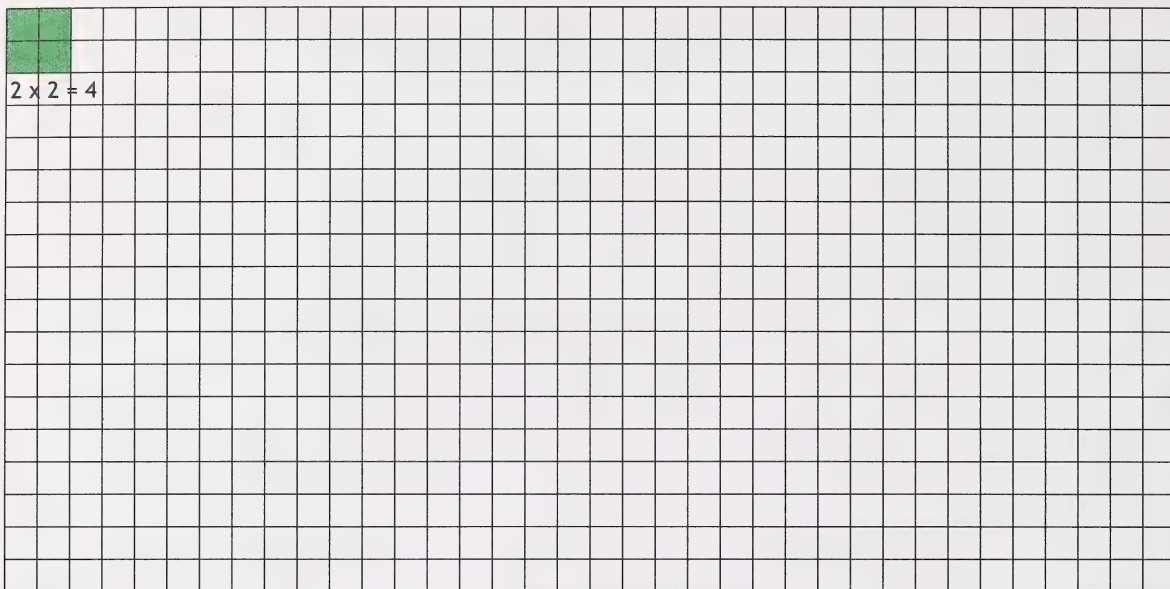
$$3 \times 3 = 9$$



The numbers 1, 4, and 9 are examples of **square numbers**.

6. On the grid on the following page, colour the squares to show the squares for the numbers 1 to 9. Write the multiplication sentence below each square. An example has been done for you. Work carefully so you have room for all the square numbers.

- 1×1
- 2×2
- 3×3
- 4×4
- 5×5
- 6×6
- 7×7
- 8×8
- 9×9



Check your answers in the Appendix.

7. Complete each multiplication fact. Read each one aloud as you work.

a. $5 \times 5 =$ _____

b. $3 \times 3 =$ _____

c. $6 \times 6 =$ _____

d. $2 \times 2 =$ _____

e. $4 \times 4 =$ _____

f. $8 \times 8 =$ _____

g. $1 \times 1 =$ _____

h. $9 \times 9 =$ _____

i. $7 \times 7 =$ _____



Check your answers in the Appendix.



Taking Another Look

The following activities are optional. You may choose to do them or not. You **should** complete the activities if you feel you need more practice learning the multiplication number facts.

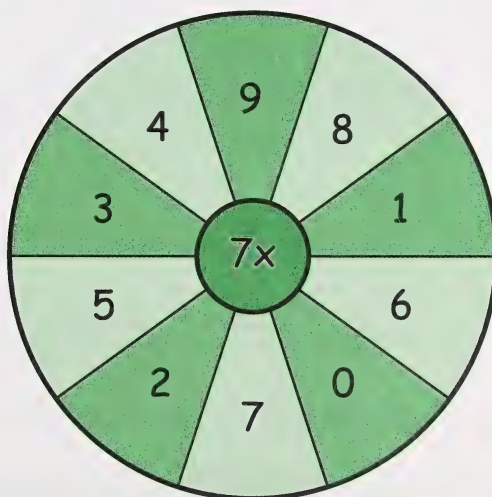
If you choose **not** to do the activities at this time, you may wish to return here later to review the basic facts before completing the review activities for Day 10.

Math Wheels

If you need more practice with the **multiplication** number facts, or if you want to improve your speed, try using Math Wheels. They're easy to make.

Cut out a circle and use a ruler to divide the circle into ten sections (as if you were cutting a pie into pieces). Trace around a glass or a can to make a smaller circle in the centre.

In the centre write a number such as 7 (with a multiplication sign). In the ten sections around the outside, write the numbers from 0 to 9 in random order.





This is your “7 times” wheel. Use it to improve your speed. Go around the wheel as quickly as you can and recite each number fact. To help you check your answers, have your home instructor write the correct answer on the back of each section of the wheel.

Make other wheels with different numbers in the middle and practise often!

Missing Factors

A good way to learn the multiplication facts is to practise naming the missing factor.

Example

$$7 \times \text{?} = 42$$

Think: $7 \times 6 = 42$

8. Try to name the missing factors in the following sentences. Then use your multiplication facts chart or your calculator to help you fill in the missing factors.

a. $8 \times \underline{\hspace{2cm}} = 56$

b. $9 \times \underline{\hspace{2cm}} = 81$

c. $7 \times \underline{\hspace{2cm}} = 63$

d. $\underline{\hspace{2cm}} \times 4 = 24$

e. $\underline{\hspace{2cm}} \times 6 = 36$

f. $\underline{\hspace{2cm}} \times 8 = 32$

g. $8 \times \underline{\hspace{2cm}} = 40$

h. $\underline{\hspace{2cm}} \times 6 = 54$

i. $6 \times \underline{\hspace{2cm}} = 48$

j. $\underline{\hspace{2cm}} \times 5 = 25$

k. $\underline{\hspace{2cm}} \times 5 = 45$

l. $\underline{\hspace{2cm}} \times 8 = 64$



Check your answers in the Appendix.



Just For Fun



SPIN A FACT

For more fact practice, try playing this game. Cut out the spinner and the instructions for putting it together from the Cut-Out Learning Aids section of the Appendix.

Choose which multiplication table you are going to practise. For example, if you are practising the $4\times$ table, you would spin the spinner and multiply the number the spinner lands on by 4. Whichever player calls out the correct answer first gets a point.

Before you begin the game, decide how many points a player will need to be the winner.

You could also use this spinner on your own to practise the facts. The multiplication chart you made earlier would be a good way to check your answers.

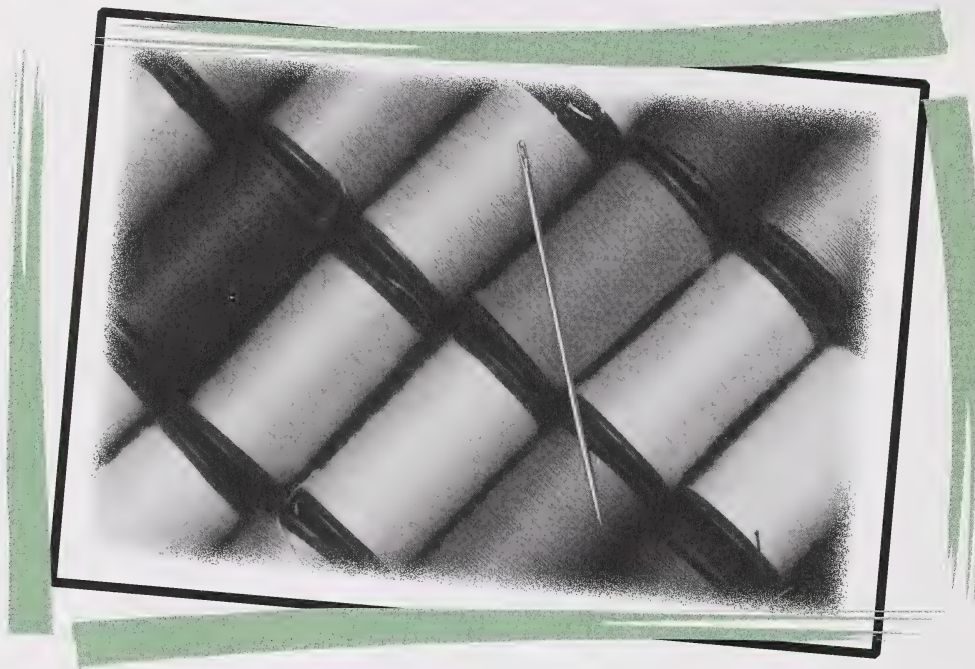
Turn to Assignment Booklet 5A, and complete the activities for Day 4.





Splitting Arrays

Yesterday you worked with arrays and learned how to rearrange them. Today you will learn that you can split arrays.

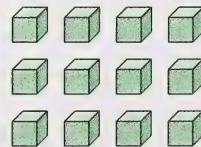


Splitting Arrays

To find the number of objects in an array, it is sometimes easier to split the array.

Find the page called Day 5: One Cubes in the Appendix.

Make this array using the ones cubes.



The array shows three rows of 4 (3×4).

The multiplication sentence for this array is $3 \times 4 = 12$. There are 12 cubes.



The array can be split. Move your cubes so the array looks like this.



You now have one row of 4 (1×4) and two rows of 4 (2×4). This is the same as three rows of 4 (3×4).

You can write an arithmetic sentence with brackets to show this.

$$3 \times 4 = (1 \times 4) + (2 \times 4)$$

To find out how many cubes there are, first **multiply** and then **add**.

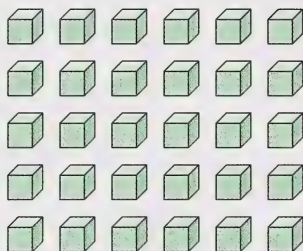
$$\begin{array}{ccc} 3 \times 4 = (1 \times 4) + (2 \times 4) \\ \begin{array}{cc} (1 \times 4) & (2 \times 4) \end{array} & \text{Multiply} \\ \begin{array}{ccc} \downarrow & & \downarrow \\ 4 & + & 8 \end{array} & \text{Add} \\ \begin{array}{ccc} \swarrow & & \searrow \\ & 12 & \end{array} \end{array}$$

There are 12 cubes.

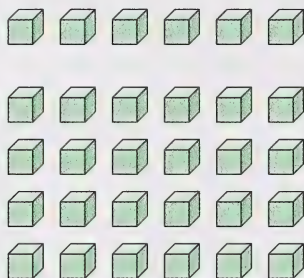
The answer is the same as the answer for the 3×4 array because the number of cubes in the array has not changed.



1. Make a 5×6 array with your cubes.



There is more than one way to split this array. Move the top row of cubes away from the others.



- a. What are the two multiplication sentences for these arrays?

• _____ • _____

- b. Write the arithmetic sentence you would use. Then find the total number of cubes. Remember to multiply and add. Refer to the previous example if you need help.

$$5 \times 6 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}} \quad \text{Multiply}$$

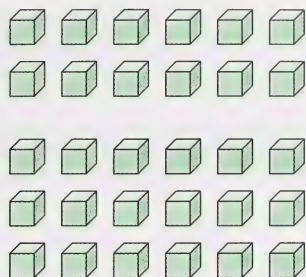
$$= \underline{\hspace{2cm}} \quad \text{Add}$$

$$= \underline{\hspace{2cm}} \quad \text{Total}$$

Check your answers in the Appendix.



2. Make the 5×6 array again. This time move two rows away from the rest.



- a. What are the two multiplication sentences for these arrays?

• _____ • _____

- b. Write the arithmetic sentence and find the total number of cubes.
Remember to multiply and add.

Check your answers in the Appendix.

3. Use your cubes to make a 6×7 array. Split the array in **three** different ways. Write the arithmetic sentence and find the total number of cubes for each.

• _____

• _____

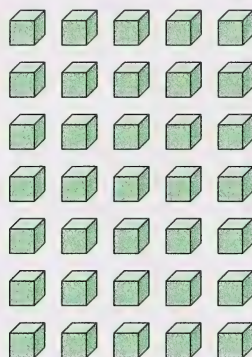


- _____



Check your answers in the Appendix.

4. Here is a 7×5 array. It can be split into other arrays. Use your cubes if you need help to find the missing numbers.



- 7 fives is the same as 6 fives and _____ five.
- 7 fives is the same as 5 fives and _____ fives.
- 7 fives is the same as 4 fives and _____ fives.



Check your answers in the Appendix.

5. Finish the arithmetic sentence for each set of arrays in question 4.

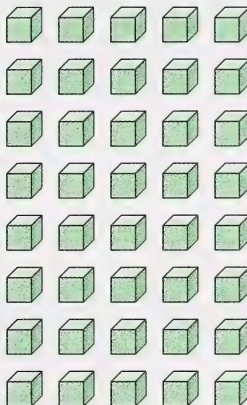
- $7 \times 5 = (\text{_____} \times \text{_____}) + (\text{_____} \times \text{_____})$
- $7 \times 5 = (\text{_____} \times \text{_____}) + (\text{_____} \times \text{_____})$



c. $7 \times 5 = (\text{ } \times \text{ }) + (\text{ } \times \text{ })$

Check your answers in the Appendix.

6. Here is an 8×5 array. Use your cubes to help you find the missing numbers.



- a. 8 fives is the same as 7 fives and _____ five.
- b. 8 fives is the same as 6 fives and _____ fives.
- c. 8 fives is the same as 5 fives and _____ fives.
- d. 8 fives is the same as 4 fives and _____ fives.
7. Write the arithmetic sentence and find the total for each split array in question 6.

a. _____

b. _____

c. _____

d. _____



Check your answers in the Appendix.

Splitting Number Facts

You can use what you have learned about splitting arrays to help you learn the multiplication number facts.

For example, the number fact 8×5 can be split in several ways. In each case, 8×5 is reduced to two simpler number facts.

- $8 \times 5 = (4 \times 5) + (4 \times 5) \longrightarrow 20 + 20 = 40$
- $8 \times 5 = (3 \times 5) + (5 \times 5) \longrightarrow 15 + 25 = 40$
- $8 \times 5 = (2 \times 5) + (6 \times 5) \longrightarrow 10 + 30 = 40$
- $8 \times 5 = (1 \times 5) + (7 \times 5) \longrightarrow 5 + 35 = 40$

8. In the following questions, split the number fact into two simpler facts. Write an arithmetic sentence using the two facts. Then find the total by **multiplying** first and then **adding**. An example is shown.

Example: 9×6

$$\begin{aligned} 9 \times 6 &= (9 \times 4) + (9 \times 2) \\ &= 36 + 18 \\ &= 54 \end{aligned}$$

You could also have used

$$\begin{aligned} &(9 \times 5) + (9 \times 1) \\ \text{or } &(9 \times 3) + (9 \times 3). \end{aligned}$$

a. 6×6

b. 7×8



Check your answers in the Appendix.

Mental Math



Tacking on Zeros



9. You already know that when you multiply by 1, the product will be the other factor. Now look what happens when you multiply by 10. Complete the following questions. You may use your calculator.

a. $10 \times 1 =$ _____

b. $10 \times 2 =$ _____

c. $10 \times 3 =$ _____

d. $10 \times 4 =$ _____

e. $10 \times 5 =$ _____

f. $10 \times 6 =$ _____

g. $10 \times 7 =$ _____

h. $10 \times 8 =$ _____

i. $10 \times 9 =$ _____

j. $10 \times 10 =$ _____



Check your answers in the Appendix.

10. Study your answers to question 9 and look for a pattern. Write a rule to help you multiply by 10.



Check your answers in the Appendix.

11. Use the rule to help you multiply these numbers.

a. $23 \times 10 =$ _____

b. $46 \times 10 =$ _____

c. $89 \times 10 =$ _____

d. $100 \times 10 =$ _____

e. $431 \times 10 =$ _____

f. $999 \times 10 =$ _____



Check your answers in the Appendix.

Study these multiplication sentences.

$6 \times 1 = 6$

$54 \times 1 = 54$

$6 \times 10 = 60$

$54 \times 10 = 540$

$6 \times 100 = 600$

$54 \times 100 = 5400$

- 12. a.** What is happening in each multiplication sentence? Describe the pattern you see.

When you multiply by 1, you know the product is the other factor. When you multiply by 10, you attach one zero.

$$6 \times 10 = 60 \text{ or } 54 \times 10 = 540$$

- b.** When you multiply by 100, how many zeros do you attach? _____

- 13.** Complete these questions by tacking on the correct number of zeros.

a. $5 \times 100 =$ _____

b. $33 \times 100 =$ _____

c. $12 \times 100 =$ _____



Check your answers in the Appendix.

- 14.** Use the rules for multiplying by 10 and 100 to complete the following questions.

a. $50 \times 10 =$ _____

b. $43 \times 100 =$ _____

c. $67 \times 100 =$ _____

d. $59 \times 100 =$ _____

e. $87 \times 100 =$ _____

f. $889 \times 10 =$ _____




Check your answers in the Appendix.

Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice	
Multiplication Number Facts	
	Number Completed in 2 Minutes _____
	Number Correct in 2 Minutes _____
	Record your score on the Number Facts Progress Chart.

15. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$9 \times 8 =$

$8 \times 3 =$

$8 \times 8 =$

$7 \times 8 =$

$6 \times 8 =$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$7 \times 5 =$

$9 \times 3 =$

$8 \times 9 =$

$8 \times 6 =$

$9 \times 7 =$

$$\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5A, and complete the activities for Day 5.





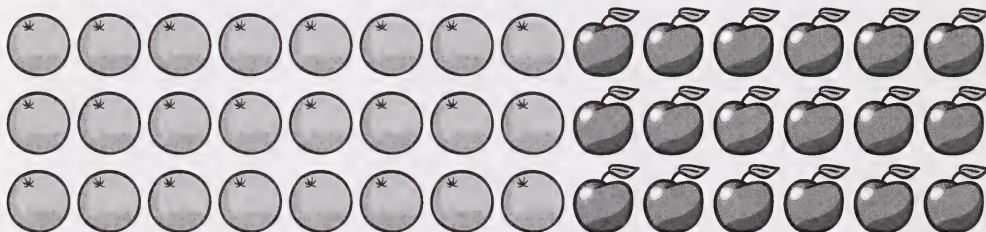
Splitting Larger Arrays

Splitting Arrays that Contain Different Objects

Sometimes an array may be quite large. It may be difficult to find the total number of objects in the array.

Example

Lucie went shopping and saw a display of fruit. The oranges and apples were side by side in the same array.



The fruit was arranged in three rows. Lucie wondered how she could find out how many oranges and apples there were altogether.

First, she looked at the oranges and saw that they were arranged in a 3×8 array.



Next she looked at the apples. She saw that they were arranged in a 3×6 array.



Lucie knows there are 24 oranges and 18 apples. To find the total in the array, all she has to do is add them together.

$$24 + 18 = 42$$

There are 42 oranges and apples in the array.

Lucie wrote an arithmetic sentence for the array.

$$(3 \times 8) + (3 \times 6) =$$
$$24 + 18 = 42$$

There are 42 oranges and apples.

Lucie discovered that it was easy to find the total number of apples and oranges by splitting the array into two smaller arrays. She then found how much fruit was in each of the smaller arrays by multiplying. She added the two products together to find the total number.



Lucie found a large array of chocolate and bran muffins.



Use your manipulatives to make the array Lucie saw. Use two different colours or kinds of manipulatives to show the two different kinds of muffins.

To find out how many muffins there were, Lucie split the array.

1. a. What are the two smaller arrays in this large array?

• _____ • _____

- b. How many chocolate muffins are there?

- c. How many bran muffins are there?

- d. How many muffins are there altogether?

- e. Fill in the blanks to show how you found the total number of muffins.

(_____ \times _____) + (_____ \times _____)

= _____ + _____

= _____ muffins





Lucie found an array of soup cans. There were two different kinds of soup. Use your manipulatives to make the array Lucie saw. Split the array and find out how many cans of soup there were altogether.



2. a. What are the two arrays made by the soup cans?

• _____ • _____

b. How many cans of chicken soup are there?

c. How many cans of tomato soup are there?

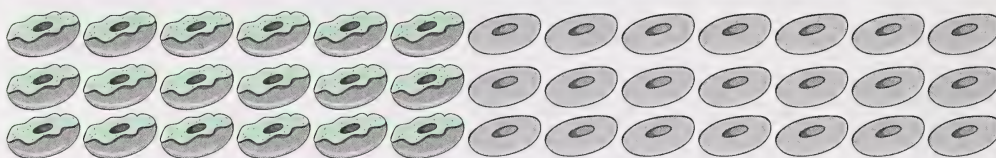
d. How many cans of soup are there altogether?

- e. Fill in the blanks to show how you found the total number of cans of soup.

$$\begin{aligned} & (\text{_____} \times \text{_____}) + (\text{_____} \times \text{_____}) \\ & = \text{_____} + \text{_____} \\ & = \text{_____} \text{ cans of soup} \end{aligned}$$

Check your answers in the Appendix.

Lucie came across an array of doughnuts in the store. Some of the doughnuts were glazed and some were sugared. Use your manipulatives to make the array that she saw.



3. Fill in the blanks to show how many doughnuts there were altogether.

$$\begin{aligned} & (\text{_____} \times \text{_____}) + (\text{_____} \times \text{_____}) \\ & = \text{_____} + \text{_____} \\ & = \text{_____} \text{ doughnuts} \end{aligned}$$

Check your answers in the Appendix.

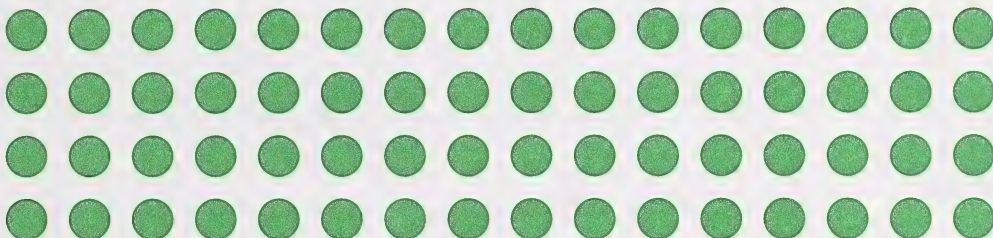
Splitting Arrays that Contain the Same Objects



So far you have seen how to split arrays that have two different kinds of objects.

What happens when the array is made up of objects that are all the same?

Make a 4×16 array with your manipulatives.



4. a. Estimate how many objects there are in the array. _____

b. How did you estimate? _____

Now find how many objects there really are. If you split the array into two smaller arrays, it will be much easier to find the total. There are many ways you can split this array, but **you need to find a way that will make finding the total easier.**

5. First try splitting the array in half so that you have two arrays of 4×8 . Move your manipulatives so you have two equal arrays.

Fill in the blanks to find how many objects there are in all.

$$\begin{aligned}(4 \times 8) + (4 \times 8) \\ = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \\ = \underline{\hspace{2cm}}\end{aligned}$$

There are objects in this array.

Was your estimate close?

Check your answers in the Appendix.



Split the array another way.

Since multiplying by 10 is easy, make one 4×10 array. The other array will be 4×6 . Move your manipulatives to make these two arrays.

Find the total number of objects.

$$\begin{aligned}(4 \times 10) + (4 \times 6) \\ = 40 + 24 \\ = 64\end{aligned}$$

There are 64 objects in this array.

The answer is the same with both ways of splitting the array!



The 4×16 array could be split in many other ways:

- $(4 \times 1) + (4 \times 15)$
- $(4 \times 2) + (4 \times 14)$
- $(4 \times 3) + (4 \times 13)$
- $(4 \times 4) + (4 \times 12)$
- $(4 \times 5) + (4 \times 11)$
- $(4 \times 6) + (4 \times 10)$
- $(4 \times 7) + (4 \times 9)$
- $(4 \times 8) + (4 \times 8)$

These splits may involve multiplying large numbers. Look for numbers that are easy for you to work with.

Can you see the pattern? In the first arrays the numbers get bigger. In the second arrays, the numbers get smaller.

6. Which split in the list above makes it easiest for you to find the total?

Why is it easier for you? _____

7. Make a 5×18 array with your manipulatives.

- a. Estimate how many objects are in the array. _____



b. Draw the array in the space below.

c. Split the array in half. Write the multiplication sentence for each new array.

• _____ • _____

d. Write the arithmetic sentence you would use for finding the total number of objects in the 5×18 array. Then find the answer.

Check back to see if your estimate was close to the actual number of objects.



Check your answers in the Appendix.

- e. Split the array in another way so that one of the arrays is 5×10 .
Write the multiplication sentence for each array.

• _____ • _____

- f. Write and complete the arithmetic sentence to find the total number of objects in the array.



Check your answers in the Appendix.

Mental Math



Tacking on Zeros

In Day 5 you saw how zeros are tacked onto the product when multiplying by 10 or 100. You can use the same strategy when one of the numbers being multiplied ends in one or more zeros.

Look at the following multiplication sentences. Can you see a pattern?

• $5 \times 3 = 15$

• $5 \times 30 = 150$

• $5 \times 300 = 1500$

• $6 \times 7 = 42$

• $6 \times 70 = 420$

• $6 \times 700 = 4200$

Did you notice that as the number of zeros in the second factor increased, so did the number of zeros in the product?

When one factor has zeros, zap them. (Pretend they're gone!)

Multiply the remaining digits in the factors and tack the zeros onto the product.

Example 1

$$6 \times 90 =$$

Zap the zero.

$$6 \times 9 = 54$$

Tack the zero back on.

$$6 \times 9 = 540$$

Example 2

$$800 \times 7 =$$

Zap the zeros.

$$8 \times 7 = 56$$

Tack the zeros back on.

$$800 \times 7 = 5600$$

8. Complete the following. Use the Tacking on Zeros strategy.

a. $6 \times 40 =$ _____

b. $9 \times 900 =$ _____

c. $7 \times 70 =$ _____

d. $300 \times 4 =$ _____

e. $8 \times 700 =$ _____

f. $30 \times 8 =$ _____



Check your answers in the Appendix.



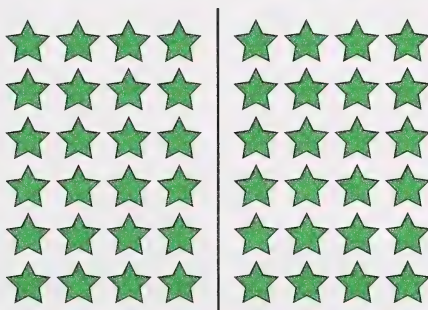
Taking Another Look

The following activities are optional. You may choose to do them or not. You **should** complete the activities if you had difficulty with the questions in Day 6, or if you feel you just need more practice with splitting arrays or numbers or with recalling the multiplication facts.

If you choose **not** to do the questions at this time, you may wish to return here later to review the concepts of splitting arrays before completing the review activities for Day 10.

Splitting Arrays

9. Use this picture to find the product of 6×8 .



- a. Write the two multiplication sentences for the split array.

- _____
- _____

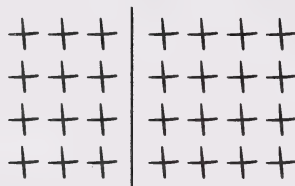
- b. Write the arithmetic sentence to find the total number of stars.



Check your answers in the Appendix.



10. Here is a 4×7 array that has been split into two smaller arrays. Find the total number of objects in this array. Make the array with your manipulatives if you need to.



- a. Write the two multiplication sentences for the split array.

- _____
- _____

- b. Write the arithmetic sentence to find the total number of objects.



Check your answers in the Appendix.

Splitting Numbers

11. Fill in the missing numbers. An example has been done for you.

Example: 9 eights is the same as 8 eights + 1 eight.

- a. 9 eights is the same as _____ eights + _____ eights.
- b. 9 eights is the same as _____ eights + _____ eights.
- c. 9 eights is the same as _____ eights + _____ eights.

12. Write the arithmetic sentence for each part of question 11. An example has been done for you.

Example

$$\begin{aligned} \underline{8} \text{ eights} + \underline{1} \text{ eight} &= (\underline{8 \times 8}) + (\underline{8 \times 1}) \\ &= \underline{64} + \underline{8} \\ &= \underline{72} \end{aligned}$$

a. $\underline{\quad\quad\quad}$ eights + $\underline{\quad\quad\quad}$ eights = $(\underline{\quad\quad\quad}) + (\underline{\quad\quad\quad})$
= $\underline{\quad\quad\quad} + \underline{\quad\quad\quad}$
= $\underline{\quad\quad\quad}$

b. $\underline{\quad\quad\quad}$ eights + $\underline{\quad\quad\quad}$ eights = $(\underline{\quad\quad\quad}) + (\underline{\quad\quad\quad})$
= $\underline{\quad\quad\quad} + \underline{\quad\quad\quad}$
= $\underline{\quad\quad\quad}$

c. $\underline{\quad\quad\quad}$ eights + $\underline{\quad\quad\quad}$ eights = $(\underline{\quad\quad\quad}) + (\underline{\quad\quad\quad})$
= $\underline{\quad\quad\quad} + \underline{\quad\quad\quad}$
= $\underline{\quad\quad\quad}$



Check your answers in the Appendix.

Turn to Assignment Booklet 5A, and complete the activities for Day 6.





Multiples



Recognizing Multiples

You are already familiar with **multiples**. When you skip count, you name the multiples for a certain number.

Given Number	Multiple
↓	↓
$4 \times 1 =$	4
$4 \times 2 =$	8
$4 \times 3 =$	12
$4 \times 4 =$	16

Notice that if you say the numbers in the Multiple column, you are skip counting!



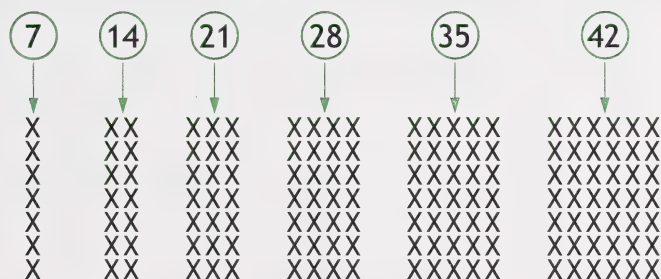
To find the multiples of a given number, just multiply that number by 1, 2, 3, 4, and so on.

To find the multiples of 7, multiply 7 by 1, 2, 3, 4, and so on.

- $7 \times 1 = 7$
- $7 \times 2 = 14$
- $7 \times 3 = 21$
- $7 \times 4 = 28$
- $7 \times 5 = 35$
- $7 \times 5 = 42$
- $7 \times 7 = 49$
- $7 \times 8 = 56$
- $7 \times 9 = 63$
- $7 \times 10 = 70$

The multiples of 7 are 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, and so on.

In a drawing, the multiples of 7 might look like this.



1. a. Find the first five multiples of 3.

_____, _____, _____, _____, _____

b. Is 24 a multiple of 3? Explain.

- c. Is 20 a multiple of 3? Explain.



Check your answers in the Appendix.

2. a. Find the first five multiples of 8.

- b. Is 36 a multiple of 8? Explain.

- c. Is 48 a multiple of 8? Explain.

3. a. Find the first six multiples of 6.

- b. Is 35 a multiple of 6? Explain.

- c. Is 54 a multiple of 6? Explain.



Check your answers in the Appendix.

4. a. Look at the numbers **10**, **30**, **25**, and **50**. Explain why they are all multiples of 5.

- b. Is 41 a multiple of 5? Explain why or why not.

- c. Write two more multiples of 5.



Check your answers in the Appendix.

Patterns in Multiples

5. Find the multiples of 2.

a. $2 \times 0 =$ _____

$2 \times 1 =$ _____

$2 \times 2 =$ _____

$2 \times 3 =$ _____

$2 \times 4 =$ _____

$2 \times 5 =$ _____

$2 \times 6 =$ _____

$2 \times 7 =$ _____

$2 \times 8 =$ _____

$2 \times 9 =$ _____

$2 \times 10 =$ _____

- b. Look at the digits in the ones place in the answers you wrote. What do you notice?



You can see the pattern in another way. Find the multiplication facts chart that you completed in Day 1. Look at the multiples of 2. Do you see that all the multiples of 2 are even numbers?

- c. Predict the product of 2×11 . _____

Predict the product of 2×12 . _____

- d. Explain how you made your predictions.



Check your answers in the Appendix.

6. a. Now look at the multiples of 5 on the multiplication facts chart. Describe the pattern you see in the ones digits.

- b. Predict the product of 5×11 . _____

Predict the product of 5×12 . _____

- c. Explain how you made your predictions.



Check your answers in the Appendix.

7. a. Look at the multiples of 9. What patterns can you find?

- b. Predict the product of 9×11 . _____





Predict the product of 9×12 . _____

- c. Explain how you made your predictions.



Check your answers in the Appendix.

8. a. Draw the missing pictures and write a multiplication sentence for boxes 5 and 6.

1.	2.	3.	4.	5.	6.
					
$1 \times 3 = 3$	$2 \times 3 = 6$	$3 \times 3 = 9$	$4 \times 3 = 12$		

- b. Look at box 6. How many squares are in each row? _____




- c. How many rows are there in box 6? _____

- d. How many squares are there altogether in box 6? _____



Check your answers in the Appendix.

9. a. Draw the missing pictures and write a multiplication sentence for each empty box.

1.	2.	3.	4.	5.	6.	7.
						
$1 \times 4 = 4$	$2 \times 4 = 8$	$3 \times 4 = 12$				

- b. How many cookies will be in box 7? _____



Check your answers in the Appendix.

Multiplication Facts and Strategies

Even and Odd Numbers

10. Complete these questions about even and odd numbers.

- a. Even numbers end in _____, _____, _____,
_____, and _____.

- b. Odd numbers end in _____, _____, _____,
_____, and _____.



Check your answers in the Appendix.

11. Now look at odd and even numbers in multiplication. Multiply the factors in each chart. Write the products in the boxes.

a.

\times	8 (even)	7 (odd)
4 (even)		
5 (odd)		

b.

\times	6 (even)	9 (odd)
6 (even)		
7 (odd)		

12. From looking at the patterns, what rules can you make about multiplying odd and even numbers?

a. odd \times odd = _____

b. even \times even = _____

c. even \times odd = _____

d. odd \times even = _____

Check your answers in the Appendix.

13. Tell if the product will be odd or even in the following sentences. You **do not** have to calculate the products.

a. 6×8 _____ b. 7×8 _____ c. 3×3 _____

d. 4×9 _____ e. 5×3 _____ f. 3×4 _____

Check your answers in the Appendix.



Basic Number Facts Practice




Before you begin your Assignment Booklet activity for today, it's time to practise some basic multiplication facts.



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Multiplication Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

14. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

$7 \times 7 =$

$9 \times 2 =$

$8 \times 8 =$

$7 \times 5 =$

$9 \times 9 =$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$0 \times 4 =$

$7 \times 9 =$

$5 \times 4 =$

$3 \times 4 =$

$8 \times 6 =$

$$\begin{array}{r} 7 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5A, and complete the activities for Day 7.





More About Factors

Grouping Property for Multiplication

Sometimes you may be asked to multiply more than two factors together. For example, you may need to solve $3 \times 2 \times 5$. How do you do this?

Read on as Tiger and Lucie try to solve this problem.

Tiger is trying to complete the multiplication sentence $3 \times 2 \times 5 =$.



$$\begin{aligned}\text{He wrote } & 3 \times (2 \times 5) \\ & = 3 \times 10 \\ & = 30\end{aligned}$$

Lucie has the same multiplication sentence to complete.

$$\begin{aligned}\text{She wrote } & (3 \times 2) \times 5 \\ & = 6 \times 5 \\ & = 30\end{aligned}$$



Tiger and Lucie both got the same product for their multiplication sentence, but they completed it in different ways. They used the **grouping property for multiplication**.

Remember: Changing the grouping of the factors does not change the product.

Example

$$(1 \times 3) \times 4 = 1 \times (3 \times 4)$$

$$3 \times 4 = 1 \times 12$$

$$12 = 12$$



1. Complete the following questions. Multiply the two factors in brackets first.

a. $(5 \times 2) \times 3 =$ _____
= _____

$5 \times (2 \times 3) =$ _____
= _____

b. $(4 \times 2) \times 0 =$ _____
= _____

$4 \times (2 \times 0) =$ _____
= _____

c. $(6 \times 2) \times 2 =$ _____
= _____

$6 \times (2 \times 2) =$ _____
= _____

Check your answers in the Appendix.

2. Group these multiplication questions in any way and complete them. Use brackets to show how you grouped the numbers.

a. $2 \times 3 \times 5 =$ _____

b. $4 \times 2 \times 5 =$ _____

c. $3 \times 4 \times 10 =$ _____

Check your answers in the Appendix.



Special Factors

Multiplying by 9

Remember, a digit is any of the number symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9) used to write numbers.

Rule: When you multiply by 9, the first digit in the product will always be one less than the number being multiplied by 9.

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

Notice that the first digit in the product is 5.
Five is one less than 6.

(5)4

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

Notice that the first digit in the product is 3.
Three is one less than 4.

(3)6

3. What is the first digit in each of these products?

a. $\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$

b. $\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$

c. $\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$

d. $\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$

e. $\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$

f. $\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$

Check your answers in the Appendix.



Rule: When you multiply a single digit by 9, the **sum** of the digits of the product is always 9.

$$9 \times 6 = 54$$

$$(5 + 4 = 9)$$

$$7 \times 9 = 63$$

$$(6 + 3 = 9)$$

This is a quick way to check your work. If you are multiplying by 9 and the sum of the digits in the product is **not** 9, then you have made a mistake!

4. Complete these numbers so that the sum of the digits will be 9. An example has been done for you.

Example: 63

a. 3 ____

b. 8 ____

c. 4 ____

d. 2 ____

e. 5 ____

f. 1 ____

g. 7 ____

Check your answers in the Appendix.

5. Complete the following multiplication facts.

a.
$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 9 \\ \times 1 \\ \hline \end{array}$$

Check your answers in the Appendix.



Just For Fun



Finger Math—The Amazing Nines

You can use your fingers to help you learn the 9 times table.

Directions

- Hold both hands with the palms facing away from you.
- Use your **fingers and thumbs**.
- Always start multiplying from the left side.
- To multiply 3×9 , bend down the third finger from the left.

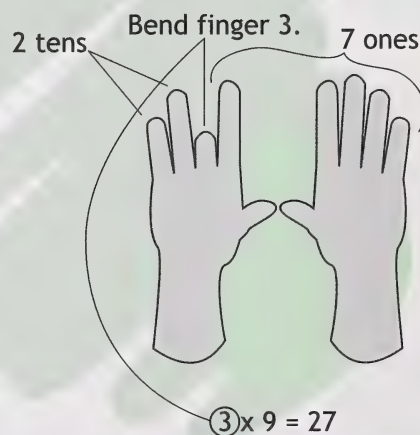
- Now count the fingers to the left of your bent finger. Each finger counts as 10.

10, 20

- Now count the fingers to the right of your bent finger. Each finger counts as 1.

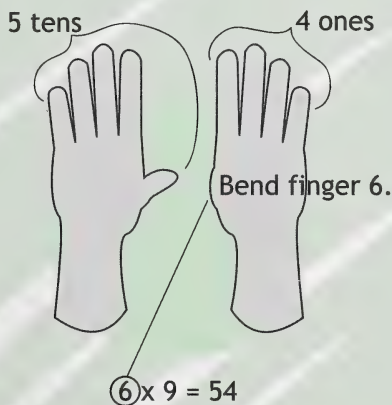
1, 2, 3, 4, 5, 6, 7

- The answer is $20 + 7$ or **27**. ($3 \times 9 = 27$)



Try another example, 6×9 .

- Bend the sixth finger from the left side.
- Count the fingers to the left of your bent finger. Each one counts as 10.
10, 20, 30, 40, **50**
- Count the fingers to the right of your bent finger. Each one counts as 1.
1, 2, 3, **4**
- The answer is $50 + 4 = 54$. ($6 \times 9 = 54$)



Try doing more multiplication problems with the number 9 on your fingers to help you learn the facts!

Taking Another Look



The following activities are optional. You may choose to do them or not. You **should** complete the activities if you feel you need more practice skip counting or learning about multiples.

If you choose not to complete the activities today, you may wish to return here later to review the basic facts before completing the review activities for Day 10.

6. Use the following chart to help you skip count.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

- a. Use a green crayon to skip count by 6 to 60. Colour the boxes that contain multiples of 6. List the numbers below.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

- b. Use a blue crayon to skip count by 7 to 70. Colour the boxes that contain multiples of 7. List the numbers below.

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

Check your answers in the Appendix.





Ask your home instructor to help you play the Skip Counting games. You will need a die (dice) for the first game and a deck of cards for the second game.

Skip Counting Game 1

This game is a good way to practise skip counting. You will need one die (dice) and someone to play with. Player 1 tosses the die. Player 2 skip counts beginning with that number for ten more numbers.

For example, if you roll a 2, your partner would have to begin at 2 and count 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22. If all the skip counts are correct, Player 2 would score one point. Player 2 now tosses the die for Player 1. The first player to ten points is the winner.

Use your multiplication facts chart to check the answers.

Skip Counting Game 2

You will need a deck of cards with the jacks, queens, and kings removed. Deal each player six cards. Player 1 selects a card from Player 2's hand. Beginning with that number, Player 1 must skip count for ten numbers. If successful, Player 1 keeps that card. If Player 1 makes a mistake, he or she must give the card to Player 2. Player 2 picks up another card so there are six cards in his or her hand. After a set time, the players count up their cards. The player with the most cards wins.

Your multiplication facts chart would be a good way to check the answers.

Turn to Assignment Booklet 5A, and complete the activities for Day 8.





Using Multiplication to Solve Word Problems



Multiplication is used every day. It is used in shopping, playing games, business, and in many other everyday events.

A word problem asks a question that needs to be answered. When solving word problems, it is important that you show the multiplication sentence or the arithmetic sentence. You will need to include a word sentence that answers the question.

One-Step Problems

Some word problems are very simple. You must first examine the problem and decide how to solve it. If it helps, draw a picture.

Example

Jeff has 4 packages of tennis balls. Each package contains 5 tennis balls. How many tennis balls does Jeff have?



Now you must decide how to solve this problem. You know you have 4 groups of 5. To find the total, you must multiply.

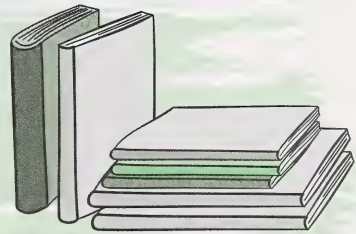
The multiplication sentence would be $4 \times 5 = 20$.

Jeff has 20 tennis balls.

It's your turn to solve some word problems. Remember to think through each problem first to decide how you are going to solve it.

1.

A bookshelf in Kiko's room has 6 shelves. On each shelf there are 7 books. How many books does Kiko have?



Multiplication sentence: _____

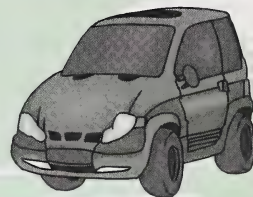
Sentence answer: _____

Check your answers in the Appendix.



2.

There are 5 cars in each row of a parking lot.
The parking lot has 8 rows. How many cars
are in the parking lot?



Multiplication sentence: _____

Sentence answer: _____



Check your answers in the Appendix.

3.

Stephan bought 6 packages of candies. There are
8 candies in each package. How many candies
does Stephan have?



Multiplication sentence: _____

Sentence answer: _____



Check your answers in the Appendix.

4.

A bouquet of flowers has 9 flowers. Each flower has 4 leaves and 4 petals. How many leaves and petals does the bouquet have altogether?



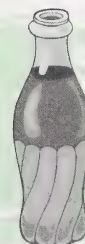
Multiplication sentence: _____

Sentence answer: _____

Check your answers in the Appendix.

5.

Jackson needs 38 bottles of pop for his party. If he buys 6 six-packs will he have enough pop?



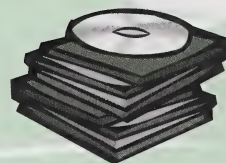
Multiplication sentence: _____

Sentence answer: _____

Check your answers in the Appendix.

6.

Kathy has 6 CDs. Pat has 9 times as many CDs as Kathy. How many CDs does Pat have?



Multiplication sentence: _____

Sentence answer: _____



Check your answers in the Appendix.

Writing Your Own One-Step Problem

Look back at the word problems that you just completed. All the problems involved groups of objects and total numbers in these groups. You used multiplication sentences to help you solve.

Now, write your own multiplication problem!

7. Imagine you are asked to help buy supplies for a family picnic. Think about things like packages of paper plates or cups, packages of hot dogs, or sets of lawn chairs. You will have other ideas, too.

a. Write the words for a multiplication problem about your picnic. Use the multiplication sentence $8 \times 6 =$.

b. Solve the problem.

Solution: $8 \times 6 =$ _____

Sentence answer: _____



Have your home instructor read your word problem. Then check your answers in the Appendix.

Problems with More Than One Step

Some problems require more than one step. You may have to multiply and then add or subtract to find the answer.

Example

Jane counted 4 tricycles and 7 bicycles in a store. How many wheels are there on the tricycles and bicycles?



Step 1: You need to find how many wheels there are on the tricycles.
Multiply.

$$4 \times 3 = 12$$

Step 2: You need to find how many wheels there are on the bicycles.
Multiply.

$$7 \times 2 = 14$$

Step 3: To find how many wheels there are altogether, add the products.

$$12 + 14 = 26$$

There are 26 wheels on the tricycles and bicycles.

This could be written in one arithmetic sentence.

$$\begin{aligned} &(4 \times 3) + (7 \times 2) \\ &= 12 + 14 \\ &= 26 \end{aligned}$$

There are 26 wheels on the tricycles and bicycles.



Now try some problems on your own. Show all of your work and remember to include a sentence answer.

8. John counted 8 cows and 7 chickens in the barn.
How many legs were there altogether?

a. Step 1



b. Step 2

c. Step 3

d. Sentence answer: _____

e. Put it together into one arithmetic sentence and show the answer.



Check your answers in the Appendix.

9. Mom, Dad, Grandma, and 3 children are going to a movie. The ticket prices are as follows:

Adults	\$5.00
Children	\$3.00
Seniors	\$4.00

How much will it cost for them to go to the movie? (**Hint:** Grandma is a senior.)



Check your answers in the Appendix.



10. Jack went shopping. He bought 6 boxes of chips that cost \$4.00 each and 8 six-packs of pop that cost \$3.00 each. How much did Jack spend?



Check your answers in the Appendix.

Mental Math



Doubling

How much are two candy bars?



You have twice as many candy bars as I do!



Doubling is something you do every day, sometimes without even thinking about it. Doubling is a very useful mental math strategy. It helps make problems easier to do in your head. There is an easy way to double in your head.

For example, if you want to double the number 36, you could follow these steps:

- Expand the number.

$$36 = 30 + 6$$

- Double each expanded part.

$$\begin{array}{r} 30 + 6 \\ \times \quad 2 \\ \hline 60 + 12 \end{array}$$

- Add the doubles.

$$60 + 12 = 72$$

11. a. Double 43.

First, expand 43. _____

Second, double each expanded part. _____

Then add. _____

b. Double 81.

First, expand 81. _____

Second, double each expanded part. _____

Then add. _____

Check your answers in the Appendix.



12. Try these.

a. Double 68.

b. Double 52.



Check your answers in the Appendix.

Now try these in your head. It is not necessary to write each step unless it helps you. Just write the numbers you add to get the double.

13. a. Double 55. _____

b. Double 134. _____

c. Double 233. _____



Check your answers in the Appendix.





Just For Fun



Draw a grid like the one below. This will be your game board. It might look something like this.

16	30	45	50	63	24
81	64	49	25	18	42
48	72	20	28	32	40
30	100	49	63	36	24
45	28	42	16	50	72
20	90	25	64	10	32

To play the game, you will need two dice, the number cubes you have made, or a deck of cards with the face cards (jacks, queens, and kings) removed, and some coloured counters.

- Roll two dice or turn over two cards.
- Find the product of the two numbers on the game board.
- Cover the product with a counter.
- Each player uses different coloured counters.
- Take turns until all the spaces are filled (or until all cards have been used).
- If the product has already been covered, the play goes to the next player.
- The winner is the person with the most counters on the board.


Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Multiplication Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

14. Multiplication Number Facts
Timed Exercise: 2 minutes

$$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 8 \\ \hline \end{array}$$

$7 \times 6 =$

$9 \times 5 =$

$6 \times 8 =$

$7 \times 7 =$

$9 \times 7 =$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$8 \times 8 =$

$9 \times 1 =$

$7 \times 4 =$

$9 \times 6 =$

$6 \times 3 =$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$



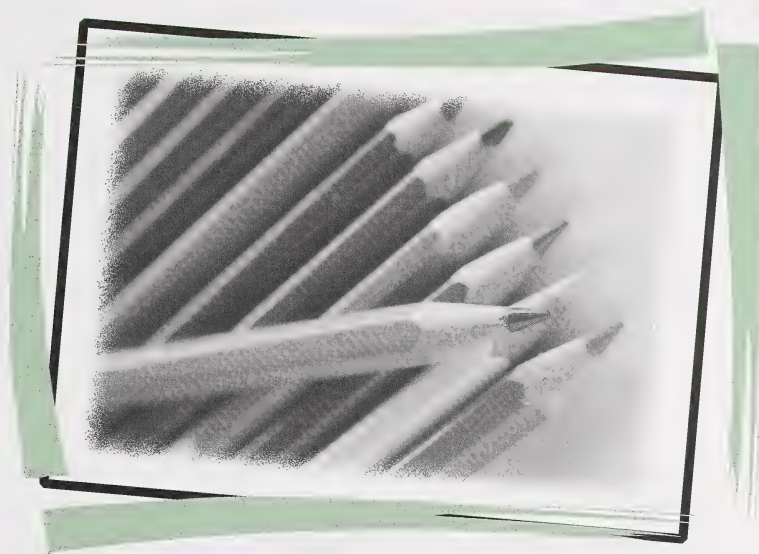
Check your answers in the Appendix.

Turn to Assignment Booklet 5A, and complete the activities for Day 9.





Putting It All Together (I)



In Section 1, you learned the following things about multiplication:

- what multiplication is
- how to use the multiplication facts chart
- some strategies for multiplying
- that repeated addition and skip counting are ways to multiply
- how to make and split arrays
- how to find the multiples of a number
- about changing the order and grouping of factors
- how to solve and write multiplication word problems

You will need to use all of these ideas and skills as you work through Section 2 of this module.

Today you will show what you have learned about multiplication by completing several review questions. You will then work on a Challenge Activity related to multiplication.

Part 1: Reviewing the Concepts

For Part 1 you will complete all of the review questions for Day 10 in Assignment Booklet 5A. First, you may wish to look back through the Student Module Booklet to review the concepts covered in Section 1.

Part 2: Challenge Activities



The Challenge Activities in Part 2 are designed to extend the ideas you have been learning and encourage you to explore new ideas. In Assignment Booklet 5A you will find two Challenge Activities. Choose **either** Activity A **or** Activity B (**or** you may do both if you wish).

Turn to Day 10 in Assignment Booklet 5A, and complete all of the review questions in Part 1. Then do one or both of the Challenge Activities in Part 2.



Assessing What You Know (I)

Today is the last day you will be working in Section 1: Understanding Multiplication. You are to complete **two** activities in Assignment Booklet 5A:

- Showing What You Can Do
- Basic Number Facts

Read the explanation of the activities for both Parts 1 and 2 before turning to Assignment Booklet 5A. Note that you will need help from your instructor for both activities.



Part 1: Showing What You Can Do



For this activity you will need the help of your home instructor. You will be working on a short activity while your home instructor observes you. As you work through the problem, try to explain clearly what you are doing.

Your home instructor may ask you questions like the following:

- “How do you know that?”
- “Why did you decide to do that?”
- “How did you get that answer?”



Note to the Home Instructor

This performance assessment should take about 15 minutes. The Home Instructor’s Assessment Page and accompanying Student’s Assessment Page can be found in Day 11 of Assignment Booklet 5A. Remove both pages from the Assignment Booklet. Read over the student’s page so you are familiar with the student’s assigned task. You should also preview the interview questions and the checklist before the student begins working on the assigned task.

As the student works to answer the questions, encourage him or her to talk about what he or she is doing. **Allow the student to use any manipulatives or cut-out learning aids available to help solve the problem.** You may or may not wish to use some of the interview questions. Look for understanding and the student’s ability to explain clearly what he or she is doing to arrive at an answer. Indicate on the checklist whether you feel the student demonstrated the skills being assessed.

Attach both assessment pages to the Assignment Booklet before sending it in for marking.

Part 2: Basic Number Facts



In this activity you will show how well you are doing at learning your basic number facts for multiplication. Ask your home instructor to time you as you do each test.

When your home instructor is ready, turn to Assignment Booklet 5A, and complete the activities found in Parts 1 and 2 of Day 11.



This is the end of Section 1: Understanding Multiplication. Check over Assignment Booklet 5A to make sure you have completed all of the assigned activities for each day. Remember that for Day 10 you need to complete the review questions in Part 1 and one or both Challenge Activities in Part 2.

Be sure to attach the **two** assessment pages from Day 11 to Assignment Booklet 5A. Then send Assignment Booklet 5A to your teacher.





Section 2

Extending Your Multiplication Skills





Problem Solving

You have been introduced to the four-step method of problem solving, and you have investigated several strategies. Today you will look at another problem-solving strategy that can be used to solve a variety of problems. Most problems can be solved using different strategies. As a result, when two people work on the same problem, they might use different methods to solve the problem.

As you work through the problems in today's lesson, you may discover a strategy you learned in an earlier module or even last year that could also be used to solve the problem. Good for you! Don't be afraid to try solving the problem a second time using another strategy (even if you already know the answer). This is a good way to become familiar with many strategies, and even learn to combine them when necessary.

Problem-Solving Strategy: Looking for a Pattern



One very useful strategy in problem solving is seeing if a pattern is occurring and then using the pattern to predict the answer to the problem.

Example 1

Tran goes to Misty Mountain every weekend to ski. He notices that there are more snowboarders every time he goes.

On the first weekend, he counted 30 snowboarders. There were 36 snowboarders the second weekend. On the third weekend, there were 41. On the fourth weekend, Tran saw 47 snowboarders. There were 52 on the fifth weekend.

If this trend continues, on which weekend will there be 90 or more snowboarders?



Step 1: Understand the problem.

Think: I need to find out on which weekend there will be 90 or more snowboarders.

Step 2: Make a plan. (Choose a strategy.)

One way to solve this problem is to look for a pattern. (Use the Looking for a Pattern strategy.)

Step 3: Try the plan.

To see if a pattern is forming, put the data in a chart or table. Using a **T-table** is an easy way to do this.

Weekend	Number of Snowboarders
1	30
2	36
3	41
4	47
5	52

Look for a pattern in the T-table. As you read down the right-hand side, notice how the number of snowboarders increases. They increase by 6, then 5, then 6, and then 5. Knowing this, you can easily predict the weekend when there will be 90 or more snowboarders.

Weekend	Number of Snowboarders
1	30
2	36 $(30 + 6)$
3	41 $(36 + 5)$
4	47 $(41 + 6)$
5	52 $(47 + 5)$

Continue the T-table pattern until you get to 90 or more snowboarders.

Weekend	Number of Snowboarders
1	30
2	36 $(30 + 6)$
3	41 $(36 + 5)$
4	47 $(41 + 6)$
5	52 $(47 + 5)$
6	58 $(52 + 6)$
7	63 $(58 + 5)$
8	69 $(63 + 6)$
9	74 $(69 + 5)$
10	80 $(74 + 6)$
11	85 $(80 + 5)$
12	91 $(85 + 6)$

ANSWER TO THE PROBLEM

There will be 90 or more snowboarders on the twelfth weekend.

Step 4: Look back.

Read the problem again. Have you answered the questions being asked?

Check over your calculations to make sure you have the correct number of snowboarders each weekend.

Is your answer reasonable, based on the information given in the problem? For example, does it seem reasonable that by the twelfth weekend there could be 90 or more snowboarders?

Example 2

Sandy's job for the summer is to pick the peas from the garden. On the first day, she picked 12 baskets of peas. On the second day, she picked 7 more baskets of peas than she did on the first day. On the third day, she picked 7 more baskets than on the second day. If this pattern continues, how many baskets of peas in all will Sandy have picked by the end of Day 7?



Step 1: Understand the problem.

1. a. What does Sandy pick from the garden? _____
- b. How many more baskets does she pick each day? _____

- c. What is the question in the problem asking you to find? _____



Check your answers in the Appendix.

A small, circular green icon with a white border. Inside the circle is a simple black-and-white cartoon character of a person with a round head, two dots for eyes, and a smile. The character is holding a large pencil in its right hand and a piece of paper in its left hand.

- Check your answers in the Appendix.

Use a T-table to help you solve the problem. Write the headings **Days** and **Number of Baskets of Peas** at the top of this table.

[illegible]

3. Fill in the T-table.

- Write **1** in the Days column and **12** in the Number of Baskets of Peas column.
- Write **2** in the Days column and **$12 + 7$** in the Number of Baskets of Peas column. You know that $12 + 7 = 19$. Also write the actual total, **19**, in the Number of Baskets of Peas column.
- Write **3** in the Days column. Write **$19 + 7$** in the Number of Baskets of Peas column. Now, calculate the total number of baskets for Day 3 ($19 + 7 = 26$). Write **26** in the Number of Baskets of Peas column for Day 3.
- Continue this pattern for seven days.

Check your completed T-table in the Appendix.

To find the total number of baskets of peas that Sandy picked, add the number of baskets of peas picked each day. That is, **add all the totals** from the right-hand column of the T-table, beginning with 12.

4. Use your calculator to find the answer. Write the solution to the problem in the answer box.

ANSWER TO THE PROBLEM



Step 4: Look back.

Read the problem again. Did you answer all of the questions being asked in the problem? Review your calculations.

Do all the numbers in your T-tables follow the pattern? Did you calculate the number of baskets of peas for each day correctly? Did I find the total number of baskets correctly? Are your answers reasonable?



Check your answers in the Appendix.

5. Show your work at each step.



Tiger is collecting tabs from pop cans to help his friend get a new wheelchair. On the first day, he collected 1 tab. On the second day, he collected 2 tabs. On the third day, he collected 4 tabs. On the fourth day, Tiger collected 8 tabs. If this pattern continues, on what day will he collect more than 500 tabs?

a. Step 1: Understand the problem.

b. Step 2: Make a plan. (Choose a strategy.)

c. Step 3: Try the plan.

ANSWER TO THE PROBLEM

d. Step 4: Look back.

Read the problem again. What questions might you ask?

Ask:

Ask:



Check your answers in the Appendix.

Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercises. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice	
Multiplication Number Facts	
	Number Completed in 2 Minutes _____
	Number Correct in 2 Minutes _____
	Record your score on the Number Facts Progress Chart.

6. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$$

$8 \times 8 =$

$6 \times 7 =$

$9 \times 6 =$

$4 \times 5 =$

$7 \times 8 =$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 6 \\ \hline \end{array}$$

$7 \times 7 =$

$9 \times 7 =$

$6 \times 8 =$

$8 \times 9 =$

$7 \times 4 =$

$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 12.





Estimation and Multiplication

Estimating

An **estimate** is a careful guess. Estimating is a good way to see if your answer makes sense or is reasonable. You have already used estimation in addition and subtraction. It can also be used in multiplication. Knowing the basic multiplication facts and the multiples of 10 is helpful in estimating.

To estimate, numbers are **rounded** and then multiplied. The estimate should be reasonably close to the actual product.



Remember: A number is rounded **down** if the ones **digit** is less than 5. For example, 43 is rounded to 40. A number is rounded **up** if the ones digit is 5 or greater. For example, 45 is rounded to 50.



1. Round these numbers to the nearest 10.

a. 26 _____

b. 93 _____

c. 75 _____

d. 134 _____

e. 188 _____

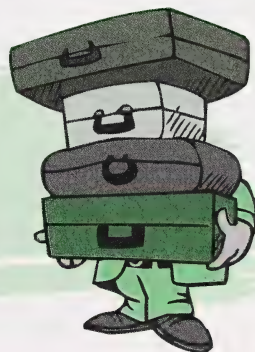


Check your answers in the Appendix.

Estimation can be used to help solve multiplication problems.

Example

There are 6 passengers on a bus. Each passenger has 36 kg of luggage. Estimate how many kilograms of luggage there are altogether.



Do you think there are more than 100 kg of luggage? Do you think there are more than 200 kg of luggage?

To estimate how many kilograms of luggage there are, you would round and then multiply.

36 is rounded to 40.

$$40 \times 6 = 240$$

There are **about** 240 kg of luggage altogether.

2.

Egbert the elephant eats 53 peanuts in a day.
About how many peanuts will he eat in 6 days?



- a. First, round 53 to _____.
- b. Multiply _____ \times _____ = _____
- c. Egbert would eat about _____ peanuts in 6 days.



Check your answers in the Appendix.

3. Estimate each product by rounding the **larger factor** only. Write the multiplication sentence you would use to find the product. An example is done for you.

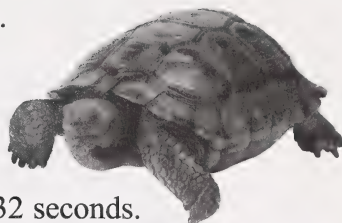
Example: $6 \times 35 =$ _____
 $6 \times 40 = 240$

- a. $5 \times 58 =$ _____
- b. $84 \times 7 =$ _____
- c. $3 \times 92 =$ _____
- d. $15 \times 9 =$ _____



Check your answers in the Appendix.

4. Use estimation to answer these word problems. Show your multiplication sentence. Write a word sentence answer.



- a. A giant tortoise can travel 8 cm in 1 second. Estimate how far it can travel in 32 seconds.

Multiplication sentence: _____

Word sentence: _____

- b. A parking lot has 8 levels. There are 87 parking spaces on each level. About how many cars can park in the parking lot?

Multiplication sentence: _____

Word sentence: _____

- c. A radio tower has 31 sections. Each section is 3 m high. About how high is the radio tower?

Multiplication sentence: _____

Word sentence: _____



Check your answers in the Appendix.

Multiplying Two-Digit Numbers

You have seen how estimation lets you find an approximate answer to a multiplication problem.

There will be many times when an estimate is not enough. You must find the **exact** answer.

You have learned that arrays and drawings of equal groups help you to multiply large numbers. Today's lesson will show you another method to multiply to find the exact answer to a problem.



Base ten blocks can be used to help you multiply. If you do not have a set of base ten blocks, you will need to use the cut-out base ten blocks found in the Appendix. Keep these cutouts to use again in other lessons.

Before you use your base ten blocks, take time now to review what you know about place value and renaming numbers.

Example: $74 = 7 \text{ tens } 4 \text{ ones}$

$183 = 1 \text{ hundred } 8 \text{ tens } 3 \text{ ones}$

5. Rename these numbers.

a. $35 =$ _____

b. $87 =$ _____

c. $142 =$ _____



Check your answers in the Appendix.

6. Rename these numbers.

a. 4 tens 6 ones = _____

b. 8 tens 9 ones = _____

c. 6 hundreds 3 tens 8 ones = _____

7. Fill in the blanks.

a. How many tens and ones are there in 41 ones?

_____ tens _____ one

b. How many tens and ones are there in 67 ones?

_____ tens _____ ones

c. How many hundreds and tens are there in 58 tens?

_____ hundreds _____ tens

Check your answers in the Appendix.

8. Find the product of 34 and 4. Use your base ten blocks and the HTO mat from the Appendix to show four groups of 34.

Hundreds	Tens	Ones
	□ □ □	□ □ □ □
	□ □ □	□ □ □ □
	□ □ □	□ □ □ □
	□ □ □	□ □ □ □

Begin with the ones. Make as many groups of ten as you can.

a. How many groups of ten did you make? _____

b. How many ones are left over? _____

Regroup: Exchange each group of 10 ones for 1 ten and place each ten in the Tens column.



Check your answers in the Appendix.

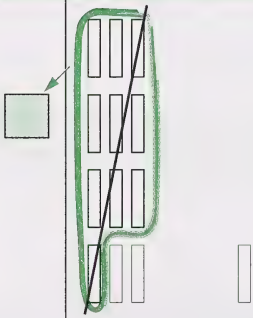

Now, use the tens and make as many groups of ten as you can.

c. How many groups of ten did you make? _____

d. How many tens are left over? _____

Regroup: Exchange each group of 10 tens for 1 hundred and place each hundred in the Hundreds column.

Now your base ten blocks will look like this.

Hundreds	Tens	Ones
	 3	 6

9. How many hundreds do you have? _____

Check your answers in the Appendix.

By using base ten blocks and an HTO mat, you discovered that $34 \times 4 = 136$.

10. This time, find the product of 46 and 6. Make 6 groups of 46 with your base ten blocks on your HTO mat.


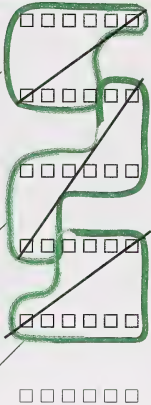
Hundreds	Tens	Ones
	□ □ □ □	□ □ □ □ □
	□ □ □ □	□ □ □ □ □
	□ □ □ □	□ □ □ □ □
	□ □ □ □	□ □ □ □ □
	□ □ □ □	□ □ □ □ □
	□ □ □ □	□ □ □ □ □

Begin with the ones. Make as many groups of ten as you can.

a. How many groups of ten did you make? _____

b. How many ones are left over? _____

Regroup: Exchange each group of 10 ones for 1 ten and place each ten in the Tens column. Your base ten blocks should now look like this.

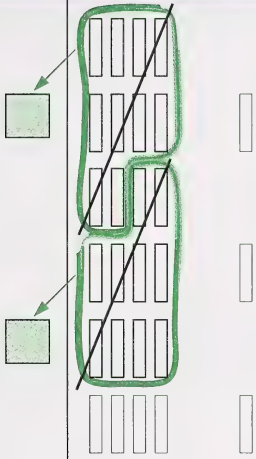

Hundreds	Tens	Ones
		 6

Now, use the tens and make as many groups of ten as you can.

c. How many groups of ten did you make?

d. How many tens are left over?

Regroup: Exchange each group of 10 tens for 1 hundred and place each hundred in the Hundreds column. Your base ten blocks should look like this.

Hundreds	Tens	Ones
		
	7	6

e. How many hundreds do you have now?

f. What is the final answer?

$$46 \times 6 = \underline{\hspace{2cm}}$$



Check your answers in the Appendix.



11. Use your base ten blocks to help you draw diagrams to show 37×8 .

Show 37×8 . (You will need to make 37 eight times.)

Hundreds	Tens	Ones



Check your answers in the Appendix.

12. a. How many ones are there? _____

Use the ones to make as many groups of ten as you can.

b. How many groups of ten did you make? _____

c. How many ones are left over? _____

Regroup: Exchange each group of 10 ones for a ten, and place each ten in the Tens column.

d. Use the chart below to show what you did with your base ten blocks to regroup the ones.

Hundreds	Tens	Ones



Check your answers in the Appendix.

13. a. How many tens are there now? _____

Use the tens to make as many groups of ten as you can.

- b. How many groups of ten did you make? _____

- c. How many tens are left over? _____

Regroup: Exchange each group of 10 tens for a hundred, and place each hundred in the Hundreds column.

- d. Use the chart below to show what you did with your base ten blocks to regroup the tens.

Hundreds	Tens	Ones

Check your answers in the Appendix.



14. a. Draw your completed model of base ten blocks.

Hundreds	Tens	Ones

b. You have _____ hundreds _____ tens _____ ones.

c. So, $37 \times 8 =$ _____ .



Check your answers in the Appendix.



- 15.** Use your base ten blocks to help you draw base ten diagrams to show 63×9 . Follow all the steps used in the previous examples and questions.

- 16.** Draw a base ten diagram to show 48×6 . Use your base ten blocks if you need to.



Check your answers in the Appendix.



Taking Another Look

The following activities are optional. You may choose to do them or not. You **should** complete the activity if you had difficulty multiplying with base ten blocks or if you just want more practice.

If you choose **not** to do the questions at this time, you may wish to return here later to review the concepts on estimation and counting before completing the review activities for Day 19.

17. Draw a base ten diagram to show $26 \times 4 =$.

Hundreds	Tens	Ones

So, $26 \times 4 =$ _____ .

Check your answers in the Appendix.



18. Draw a base ten diagram to show $53 \times 3 =$.

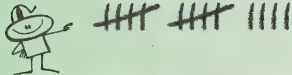
Hundreds	Tens	Ones

So, $53 \times 3 =$ _____.

Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 13.





Multiplying Two-Digit Numbers by One-Digit Numbers

Today you will learn to multiply two-digit numbers by one-digit numbers. There are two methods you will use:

- multiplying by **expanding numbers**
- multiplying using the **long form** of multiplication

Expanding Numbers to Multiply

In earlier lessons, you learned to expand numbers.

For example, you can expand the number 26.

$$26 = 20 + 6$$

1. Expand the following numbers.

a. $55 =$ _____

b. $63 =$ _____

c. $81 =$ _____

d. $15 =$ _____

e. $39 =$ _____



Check your answers in the Appendix.

Expanding numbers makes it easier to multiply them by other numbers.

Example

Find the product of 34×5 .

Expand 34 into $30 + 4$. You can then multiply using the expanded numbers.



$$\begin{aligned} 34 \times 5 &= (30 + 4) \times 5 \\ &= (30 \times 5) + (4 \times 5) \\ &= 150 + 20 \\ &= 170 \end{aligned}$$

When you multiply by expansion, you must multiply **each** of the numbers inside the brackets by the number outside the brackets.

You should also know how to multiply by arranging the factors vertically.

Example

$$\begin{array}{r} 34 \times 5 = \quad 34 \quad = 30 + 4 \\ \times 5 \quad \quad \times 5 \\ \hline \end{array}$$
$$\begin{aligned} &= (30 \times 5) + (4 \times 5) \\ &= 150 + 20 \\ &= 170 \end{aligned}$$

Example

Multiply 46 by 5.

$$\begin{array}{l} 46 \times 5 = (40 + 6) \times 5 \\ \quad = (40 \times 5) + (6 \times 5) \\ \quad = 200 + 30 \\ \quad = 230 \end{array} \quad \text{or} \quad \begin{array}{l} 46 = 40 + 6 \\ \times 5 \quad \times 5 \\ \hline \end{array}$$
$$\begin{aligned} &= (40 \times 5) + (6 \times 5) \\ &= 200 + 30 \\ &= 230 \end{aligned}$$

2. Find the product of 84 and 6. Expand 84 first.

$$\begin{aligned} 84 \times 6 &= (\underline{\quad} + \underline{\quad}) \times \underline{\quad} \\ &= (\underline{\quad\quad\quad}) + (\underline{\quad\quad\quad}) \\ &= \underline{\quad\quad\quad} + \underline{\quad\quad\quad} \\ &= \underline{\quad\quad\quad} \end{aligned}$$

or

$$\begin{array}{r} 84 = \underline{\quad} + \underline{\quad} \\ \times 6 \quad \times \underline{\quad} \\ \hline = (\underline{\quad\quad\quad}) + (\underline{\quad\quad\quad}) \\ = \underline{\quad\quad\quad} + \underline{\quad\quad\quad} \\ = \underline{\quad\quad\quad} \end{array}$$



Check your answers in the Appendix.

3. Find the following products. Expand the larger number first.

a. $65 \times 9 =$

b.
$$\begin{array}{r} 74 \\ \times 8 \\ \hline \end{array}$$



Check your answers in the Appendix.

4. Find the products for each of the following. Expand the larger number first.

a. $72 \times 8 =$

b.
$$\begin{array}{r} 29 \\ \times 7 \\ \hline \end{array}$$

c. $61 \times 7 =$

d.
$$\begin{array}{r} 83 \\ \times 4 \\ \hline \end{array}$$



Check your answers in the Appendix.

Multiplication Using the Long Form

Using this method to multiply is very much like expanding numbers. It is just a different format. Multiplying this way clearly shows what you are doing to find the product.

Example

Find the product of 56×8 . First, look at this question on a place-value chart.

H	T	O
	5	6
		$\times 8$
	4	8
4	0	0
4	4	8

$(8 \times 6 = 48)$
 $(8 \times 50 = 400)$
 $(\text{Add } 48 + 400 = 448.)$

Now, look at the multiplication without using the place-value chart.

First, multiply the ones by 8.

$$\begin{array}{r} 56 \\ \times 8 \\ \hline 48 \end{array} \quad (8 \times 6 = 48)$$

Then, multiply the tens by 8.

$$\begin{array}{r} 56 \\ \times 8 \\ \hline 48 \\ 400 \end{array} \quad (8 \times 50 = 400)$$

Add the products.

$$\begin{array}{r} 56 \\ \times 8 \\ \hline 48 \\ 400 \\ \hline 448 \end{array} \quad (400 + 48 = 448)$$

Now, put it all together and see how it works.

$$\begin{array}{r}
 56 \\
 \times 8 \\
 \hline
 48 \quad (8 \times 6 = 48) \quad \text{Multiply the ones.} \\
 400 \quad (8 \times 50 = 400) \quad \text{Multiply the tens.} \\
 \hline
 448 \quad (48 + 400 = 448) \quad \text{Add the products.}
 \end{array}$$

Example

Study the steps to find the product of 64 and 7.

H	T	O
	6	4
		$\times 7$
	2	8 $(7 \times 4 = 28)$
4	2	0 $(7 \times 60 = 420)$
4	4	8 (Add)

$$\begin{array}{r}
 64 \\
 \times 7 \\
 \hline
 28 \quad (7 \times 4 = 28) \\
 420 \quad (7 \times 60 = 420) \\
 \hline
 448 \quad (\text{Add } 28 + 420 = 448)
 \end{array}$$

5. Find the product of 73 and 6. First use a place-value chart. Then show how you multiply without it.

H	T	O
	7	3
		$\times 6$

$$\begin{array}{r}
 73 \\
 \times 6 \\
 \hline
 \end{array}$$



Check your answers in the Appendix.

6. Multiply 46 by 5. Start by using a place-value chart and then multiply without it.



Check your answers in the Appendix.

7. Find the following products using the long form of multiplication.

a.
$$\begin{array}{r} 97 \\ \times 7 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 42 \\ \times 6 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 87 \\ \times 9 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 74 \\ \times 5 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 69 \\ \times 8 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 38 \\ \times 4 \\ \hline \end{array}$$




Check your answers in the Appendix.

Hint: When you are multiplying numbers, it is easiest if you put the larger number on top. Put the smaller number underneath.

Example

It is easier to multiply $\begin{array}{r} 88 \\ \times 7 \\ \hline \end{array}$ than $\begin{array}{r} 7 \\ \times 88 \\ \hline \end{array}$.

Using the Calculator

- 
8. a. Make the largest product possible by multiplying a two-digit number by a one-digit number. Use the digits 2, 5, and 6 to make both numbers.

Since you are looking for the **largest** possible product, there would be no point in making your two-digit number start with 2 or having 2 as the one-digit number. Here are the numbers you need to use. Find the product of each using your calculator.

$$26 \times 5 = \underline{\hspace{2cm}}$$

$$25 \times 6 = \underline{\hspace{2cm}}$$

$$62 \times 5 = \underline{\hspace{2cm}}$$

$$52 \times 6 = \underline{\hspace{2cm}}$$

Which arrangement gives the largest product? $\underline{\hspace{2cm}}$

- b. Which arrangement gives the smallest product? $\underline{\hspace{2cm}}$



Check your answers in the Appendix.

9. a. Find the largest product possible by forming a two-digit number and a one-digit number from the digits 8, 7, and 6.



Which arrangement gives the largest product? _____

- b. Which arrangement gives the smallest product? _____

Check your answers in the Appendix.

Taking Another Look

The following activities are optional. You may choose to do them or not. You **should** complete the activities if you had difficulty estimating or multiplying, or if you feel you just need more practice.

If you choose **not** to do the questions at this time, you may wish to return here later to review the concepts on estimating and multiplying before completing the review activities for Day 19.

The Target Game

10. Turn to pages 178 and 179 of your textbook. This is a good game to play to practise estimation. Follow the directions. Have a friend or your home instructor play with you.



11. Use expansion to find the following products. An example is done for you.

Example

$$\begin{array}{l} 74 \times 5 = (70 + 4) \times 5 \\ \quad = (70 \times 5) + (4 \times 5) \\ \quad = 350 + 20 \\ \quad = 370 \end{array} \quad \text{or} \quad \begin{array}{l} 74 \times 5 = \begin{array}{r} 74 \\ \times 5 \\ \hline \end{array} = 70 + 4 \\ \quad \quad \quad \begin{array}{r} \times 5 \\ \hline \end{array} \quad \begin{array}{r} \times 5 \\ \hline \end{array} \\ \quad \quad \quad = (70 \times 5) + (4 \times 5) \\ \quad \quad \quad = 350 + 20 \\ \quad \quad \quad = 370 \end{array}$$

a. $56 \times 9 =$

b. $\begin{array}{r} 83 \\ \times 6 \\ \hline \end{array}$

c. $44 \times 8 =$

d. $\begin{array}{r} 39 \\ \times 7 \\ \hline \end{array}$



Check your answers in the Appendix.

12. Find the products of these numbers using the long form of multiplication. An example is done for you.

Example

$$\begin{array}{r}
 63 \\
 \times 7 \\
 \hline
 21 \\
 420 \\
 \hline
 441
 \end{array}$$

First, multiply the ones. (7×3)

Multiply the tens. (7×60)

Add the products.

H	T	O
	6	3
		$\times 7$
	2	1
4	2	0
4	4	1

a.
$$\begin{array}{r}
 56 \\
 \times 7 \\
 \hline
 \end{array}$$

b.
$$\begin{array}{r}
 87 \\
 \times 6 \\
 \hline
 \end{array}$$

c.
$$\begin{array}{r}
 94 \\
 \times 5 \\
 \hline
 \end{array}$$

d.
$$\begin{array}{r}
 85 \\
 \times 9 \\
 \hline
 \end{array}$$



Check your answers in the Appendix.


Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Multiplication Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

13. Multiplication Number Facts
Timed Exercise: 2 minutes

$$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$6 \times 7 =$

$9 \times 4 =$

$8 \times 5 =$

$5 \times 5 =$

$7 \times 9 =$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$$

$8 \times 4 =$

$7 \times 3 =$

$6 \times 5 =$

$9 \times 2 =$

$8 \times 9 =$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 14.





The Short Form for Multiplication

The Short Form for Multiplying Two-Digit Numbers by One-Digit Numbers

It is important that you learn and understand the **short form** for multiplying. This is the method that you use for all multiplication questions.

In Day 12 you were shown that you needed to **regroup** in order to multiply using base ten blocks.

When you multiply two- or three-digit numbers using the short form, you will often need to **regroup** in order to find the product.



To multiply using the short form, there are several steps that should be followed. Look at the examples and make sure you understand each step.

Example 1

Multiply 49×8 .

H	T	O
	7 4	9
		$\times 8$
		2

Step 1: Multiply the ones. ($9 \times 8 = 72$)

Step 2: Write 2 below the line in the Ones column. Regroup the 7 to the Tens column. Write a small 7 above the 4 in the Tens column.

H	T	O
	⁷ 4	9
		× 8
3	9	2

Step 3: Multiply the tens. ($4 \times 8 = 32$)

Then add the regrouped 7. ($32 + 7 = 39$)

Step 4: Add the extra regrouped tens.

Write the 9 below the line in the Tens column. Write the 3 below the line in the Hundreds column.

Step 5: The answer is 392.

Example 2

Multiply 83×6 .

H	T	O
	¹ 8	3
		× 6
		8

Step 1: Multiply the ones. ($3 \times 6 = 18$)

Step 2: Write the 8 below the line in the Ones column. Regroup the 1 to the Tens column. Write a small 1 above the 8 in the Tens column.

H	T	O
	¹ 8	3
		× 6
4	9	8

Step 3: Multiply the tens. ($8 \times 6 = 48$)

Then add the regrouped 1. ($48 + 1 = 49$)

Step 4: Add the extra regrouped tens. Write the 9 below the line in the Tens column. Write the 4 below the line in the Hundreds column.

Step 5: The answer is 498.



Now put it all together. Look at the following two examples and think about the steps to take to solve each.

H	T	O
	² 4	7
		× 4
1	8	8

$$\begin{array}{r} 2 \\ 47 \\ \times 4 \\ \hline 188 \end{array}$$

H	T	O
	¹ 3	2
		× 8
2	5	6

$$\begin{array}{r} 1 \\ 32 \\ \times 8 \\ \hline 256 \end{array}$$

1. Find the product of 45 and 5. Use a place-value chart and then multiply without using a chart.

H	T	O
	4	5
		× 5

$$\begin{array}{r} 45 \\ \times 5 \\ \hline \end{array}$$



Check your answers in the Appendix.

2. Find the product of the following numbers. Use a place-value chart to help if you need it.

a.
$$\begin{array}{r} 83 \\ \times 8 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 47 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 96 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 38 \\ \times \quad 7 \\ \hline \end{array}$$



Check your answers in the Appendix.

3. Find each of the following products.

$$\begin{array}{r} \text{a.} \quad 57 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 37 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 27 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 98 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 45 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 69 \\ \times \quad 8 \\ \hline \end{array}$$



Check your answers in the Appendix.



Using Estimation When Multiplying

You have learned that estimating to the nearest 10 is helpful when you are multiplying. Estimating the product of two factors before you multiply lets you know if your final solution is close or reasonable.

Remember: A number is rounded down if the tens digit is less than 5. A number is rounded up if the tens digit is 5 or greater.

4. Round these numbers to the nearest 100.

a. 243 is rounded to _____.

b. 698 is rounded to _____.

c. 436 is rounded to _____.

d. 862 is rounded to _____.

Check your answers in the Appendix.

5. Estimate the product by rounding the **larger factor** to the nearest 100.

Example: $436 \times 8 =$ _____ $400 \times 8 = 3200$

a. $230 \times 7 =$ _____

b. $580 \times 3 =$ _____

c. $725 \times 8 =$ _____

d. $888 \times 7 =$ _____

6. Round the **larger factor** to the nearest 100. Then estimate. Remember the Tacking on Zeros rule! An example has been done for you.

Example: $296 \times 40 =$ $300 \times 40 = 12\ 000$

a. $641 \times 20 =$ _____

b. $378 \times 50 =$ _____

c. $462 \times 40 =$ _____

d. $915 \times 80 =$ _____



Check your answers in the Appendix.

7. Round to the nearest 100 to **estimate** the answers for these word problems. Show how you estimated. Write a sentence answer for each.
- a. Stan works in a music store. He is arranging CDs in a display case. There are 20 shelves with 462 CDs on each shelf. How many CDs are there?

Sentence answer: _____

- b.** Maria collects stamps. She has 7 boxes with 176 stamps in each box. How many stamps does Maria have?



Sentence answer: _____

- c.** Jane has \$435. Jordi had 5 times that amount of money. How much money does Jordi have?

Sentence answer: _____



Check your answers in the Appendix.

For the following word problems, estimate first and then find the actual answers. Remember, you must have a sentence answer!

Example

Robin has 6 boxes of baseball cards. Each box contains 87 cards. How many cards does she have?

Estimate: $6 \times 87 = 6 \times 90$
 $= 540$

Calculation:

$$\begin{array}{r} 87 \\ \times 6 \\ \hline 522 \end{array}$$

Robin has 522 baseball cards.



8. Estimate first and then find the actual answer. Write a sentence answer.

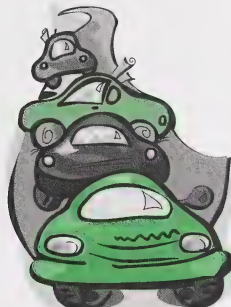
- a. There are 23 trucks delivering cartons. Each truck has 8 cartons. How many cartons are there altogether?

Estimate

Calculation

Sentence answer: _____

- b. There are 28 cars stopped at a red light. Each car holds 6 people. How many people are waiting at the red light?



Estimate

Calculation

Sentence answer: _____

- c. Seth has 6 bags of marbles. If each bag contains 62 marbles, how many marbles does he have?

Estimate

Calculation

Sentence answer: _____



Check your answers in the Appendix.



Taking Another Look

The following activities are optional. You may choose to do them or not. You **should** complete the activities if you need more practice with using the short form of multiplication.

If you choose **not** to do the questions at this time, you may wish to return here later to review the concepts on using the short form of multiplication before completing the review activities for Day 19.

More Practice Finding Products

9. Find the following products.

a.
$$\begin{array}{r} 43 \\ \times 7 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 98 \\ \times 3 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 54 \\ \times 8 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 88 \\ \times 5 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 65 \\ \times 4 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 67 \\ \times 5 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 49 \\ \times 4 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 28 \\ \times 7 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 97 \\ \times 9 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 56 \\ \times 3 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 45 \\ \times 6 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 34 \\ \times 2 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 92 \\ \times 8 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 76 \\ \times 9 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 44 \\ \times 5 \\ \hline \end{array}$$



Check your answers in the Appendix.

Basic Number Facts Practice




Before you begin your Assignment Booklet activities for today, it's time to practise some basic multiplication facts.



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Multiplication Number Facts



Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

10. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$9 \times 8 =$

$7 \times 7 =$

$6 \times 4 =$

$5 \times 6 =$

$8 \times 8 =$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$8 \times 9 =$

$9 \times 9 =$

$9 \times 6 =$

$7 \times 6 =$

$8 \times 7 =$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 15.



Multiplying Three-Digit Numbers by One-Digit Numbers

You have learned to multiply two-digit numbers by one-digit numbers using expansion, the long form, and the short form. Today you will learn to multiply three-digit numbers by one-digit numbers.

When multiplying two-digit numbers by one-digit numbers, it was possible to use arrays. Working with larger numbers makes it difficult to use arrays. However, base ten blocks can be used. Using base ten blocks makes it clear what is happening when you multiply.

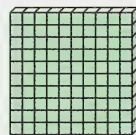
You will need the base ten block cutouts from Day 13 if you do not have your own.



Number Review

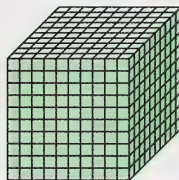


You know that there are
10 ones in 1 ten.



You know that there are
10 tens in 1 hundred.

1. How many hundreds are there in 1 thousand? _____



Check your answers in the Appendix.



You can rename 6324 in the following way.

6324 = 6 thousands 3 hundreds 2 tens 4 ones

2. Rename the following numbers.

a. 4160 = _____

b. 8946 = _____

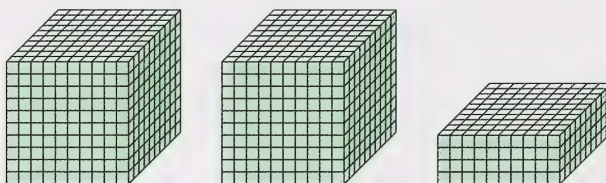
c. 9990 = _____



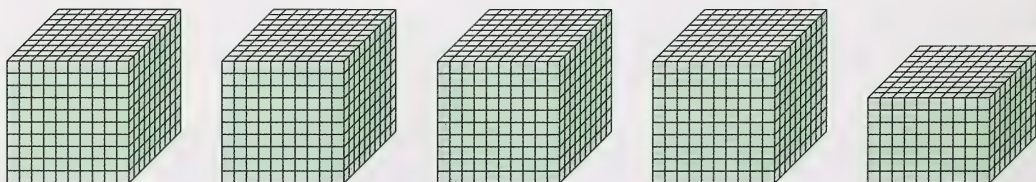
Check your answers in the Appendix.

3. How many thousands and hundreds are in the following numbers?

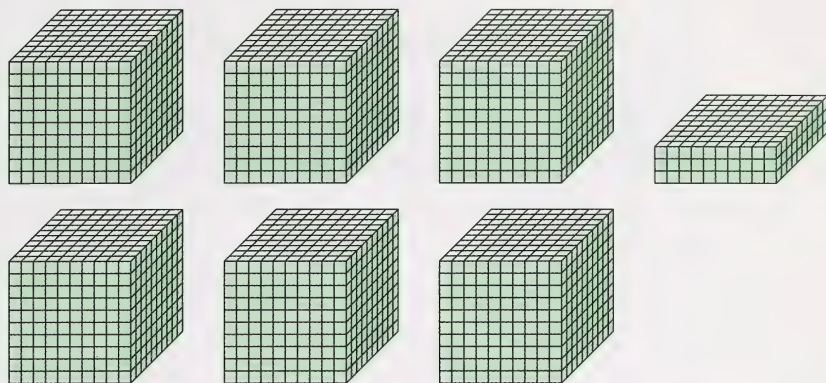
a. 24 hundreds: _____ thousands _____ hundreds



b. 47 hundreds: _____ thousands _____ hundreds



c. 63 hundreds: _____ thousands _____ hundreds



Check your answers in the Appendix.

Using Base Ten Blocks to Multiply

Use your base ten blocks and the place-value mat found in Day 16 of the Cut-Out Learning Aids section of the Appendix.

Example

Find the product of 546 and 3. Use your base ten blocks to show 546 three times.

Thousands	Hundreds	Tens	Ones
	<div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div>	<div>□ □ □</div> <div>□ □ □</div> <div>□ □ □</div>	<div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div>

Begin by making groups of ten in the Ones column. Put a circle around each group of ten.

Regroup: Exchange each group of 10 ones for a ten, and place each ten in the Tens column.

4. a. How many groups of ten can you make in the Ones column?

b. After regrouping the ones, how many ones will be left over?



Check your answers in the Appendix.

Your base ten blocks should look like this.

Thousands	Hundreds	Tens	Ones
	<div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div>	<div> </div> <div> </div> <div> </div>	<div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> <div>8</div>

5. a. Look at the tens. How many groups of ten can you make?


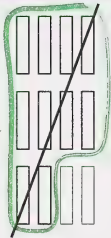
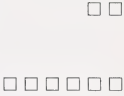
b. How many tens are left over? _____



Check your answers in the Appendix.

Regroup: Exchange each group of 10 tens for a hundred, and place each hundred in the Hundreds column.

Your model should now look like the diagram below.

Thousands	Hundreds	Tens	Ones
		 3	 8


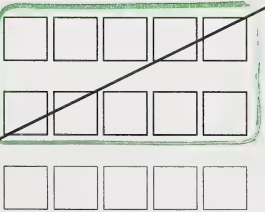

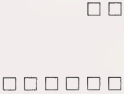
6. a. Look at the hundreds. How many groups of ten can you make?

b. How many hundreds are left over? _____



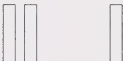
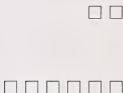
Check your answers in the Appendix.

Regroup: Exchange each group of 10 hundreds for a thousand, and place each thousand in the Thousands column.

Your model will now look like the one below.

Thousands	Hundreds	Tens	Ones
	 6	 3	 8

Your final model will look like this.

Thousands	Hundreds	Tens	Ones
 1	 6	 3	 8

You have 1 thousand, 6 hundreds, 3 tens, and 8 ones.

So, $546 \times 3 = 1638$.

Example 2



Use your base ten blocks to show 686×5 . It should look like the diagram that follows.

Thousands	Hundreds	Tens	Ones
			

Group the ones into groups of ten. There are 30 ones, so three groups of ten can be made.

Regroup: Exchange each group of 10 ones for a ten, and place each ten in the Tens column.

Thousands	Hundreds	Tens	Ones
	<div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div>	<div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div>	<div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div>
			0

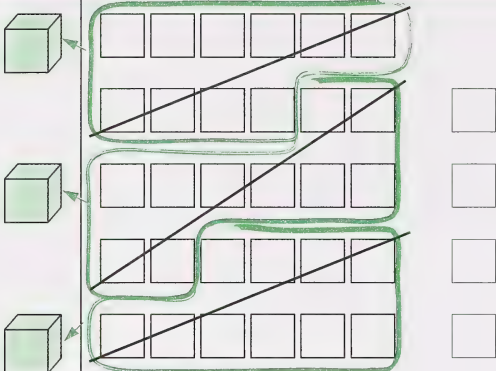

Group the tens into groups of ten. There are 43 tens, so four groups of ten can be made with 3 tens left over.

Regroup: Exchange each group of 10 tens for a hundred, and place each hundred in the Hundreds column.



Thousands	Hundreds	Tens	Ones
	<div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div> <div>□ □ □ □ □ □</div>	<div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div> <div>□ □ □ □ □ □ □ □</div>	
		3	0

Group the hundreds into groups of ten. There are 34 hundreds, so three groups of ten can be made with 4 hundreds left over.

Regroup: Exchange each group of 10 hundreds for a thousand, and place each thousand in the Thousands column.

Thousands	Hundreds	Tens	Ones
			
	4	3	0

Your final model of base ten blocks will look like this.

Thousands	Hundreds	Tens	Ones
			
3	4	3	0

You have 3 thousands, 4 hundreds, 3 tens, and 0 ones.

So, $686 \times 5 = 3430$.

7. Use your base ten blocks to multiply $754 \times 6 =$.

a. Draw the diagram below.

Thousands	Hundreds	Tens	Ones

b. Look at the ones. (How many ones are there?) Make groups of ten.

c. Exchange each group of 10 ones for a ten, and move each ten to the Tens column. How many tens did you move? _____

d. How many ones will be in the product? _____

Check your answers in the Appendix.



8. a. Look at the tens. (How many tens are there?) Make groups of ten.

- b. Exchange each group of 10 tens for a hundred. Place each hundred in the Hundreds column. How many hundreds will you move to the Hundreds column? _____

- c. How many tens will be in the product? _____

Thousands	Hundreds	Tens	Ones



Check your answers in the Appendix.

9. **a.** Look at the hundreds. (How many hundreds are there?) Make groups of ten. _____
- b.** Exchange each group of 10 hundreds for a thousand. Place each thousand in the Thousands column. How many thousands will you move to the Thousands column? _____
- c.** How many hundreds will be in the product? _____

Thousands	Hundreds	Tens	Ones

e. Draw your final diagram.

Thousands	Hundreds	Tens	Ones

f. You have _____ thousands, _____ hundreds,
_____ tens, and _____ ones.

g. So, $754 \times 6 =$ _____.



Check your answers in the Appendix.

10. a. Use your base ten blocks to draw and then multiply 542×8 .

Thousands	Hundreds	Tens	Ones

b. Complete the multiplication sentence.

$$542 \times 8 = \underline{\hspace{2cm}}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 16.





More About Multiplying Large Numbers

You have learned to multiply two-digit numbers in four different ways:

- using base ten blocks
- using expansion
- using the long form
- using the short form

Today you will use what you have already learned to help you multiply **three-digit** numbers by one-digit numbers using the expansion method and the long form.

Multiplication by Expansion

The number 635 can be written in expanded form as $600 + 30 + 5$.

1. Write the following numbers in expanded form.

a. $756 =$ _____

b. $325 =$ _____

c. $849 =$ _____



Check your answers in the Appendix.

Example

To find the product of 348 and 7, follow the three steps:

- Expand.
- Multiply.
- Add.

$$348 \times 7 = 300 + 40 + 8 \quad \leftarrow \text{Expand.}$$

$$\begin{array}{r} \times 7 \\ \hline \end{array}$$

$$= (300 \times 7) + (40 \times 7) + (8 \times 7) \quad \leftarrow \text{Multiply.}$$

$$= 2100 + 280 + 56 \quad \leftarrow \text{Add.}$$

$$= 2436$$

2. Find the product of 286 and 6.

$$286 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$\begin{array}{r} \times 6 \\ \hline \end{array} \qquad \qquad \qquad \begin{array}{r} \times 6 \\ \hline \end{array}$$

$$= (\underline{\hspace{2cm}}) + (\underline{\hspace{2cm}}) + (\underline{\hspace{2cm}})$$

$$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$



Check your answers in the Appendix.

3. Use the method shown in question 2 to complete the following multiplication questions. Use the three-step method: expand, multiply, and add. Show all your work.

a.
$$\begin{array}{r} 621 \\ \times 4 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 763 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c. } 481 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d. } 372 \\ \times 8 \\ \hline \end{array}$$



Check your answers in the Appendix.

Multiplying Using the Long Form of Multiplication

The long form of multiplying is much like expanding numbers. It clearly shows what you are doing to find the product.

Example

Multiply 623×8 .

Find the product of 623 and 8. Look at this question on a place-value chart.

TH	H	T	O
	6	2	3
			$\times 8$
		2	4
	1	6	0
4	8	0	0
4	9	8	4

$(8 \times 3 = 24)$
 $(8 \times 20 = 160)$
 $(8 \times 600 = 4800)$
 $(\text{Add } 24 + 160 + 4800 = 4984)$

To multiply without using a place-value chart, your work would look like this.

$$\begin{array}{r}
 623 \\
 \times 8 \\
 \hline
 24 \quad \leftarrow 8 \times 3 = 24 \text{ (Multiply the ones.)} \\
 160 \quad \leftarrow 8 \times 20 = 160 \text{ (Multiply the tens.)} \\
 \underline{4800} \quad \leftarrow 8 \times 600 = 4800 \text{ (Multiply the hundreds.)} \\
 4984 \quad \leftarrow \text{Add the products.}
 \end{array}$$

Example

Multiply 436×5 . First, use a place-value chart.

TH	H	T	O	
	4	3	6	
			$\times 5$	
		3	0	$(5 \times 6 = 30)$
	1	5	0	$(5 \times 30 = 150)$
2	0	0	0	$(5 \times 400 = 2000)$
2	1	8	0	$(\text{Add } 30 + 150 + 2000 = 2180)$

Then multiply without a place-value chart.

$$\begin{array}{r}
 436 \\
 \times 5 \\
 \hline
 30 \quad (5 \times 6 = 30) \\
 150 \quad (5 \times 30 = 150) \\
 \underline{2000} \quad (5 \times 400 = 2000) \\
 2180 \quad (\text{Add the products})
 \end{array}$$

4. It's your turn! It is very important when multiplying to put the digits in the correct place-value position. Be sure your digits are lined up carefully. First, use a place-value chart. Then multiply without one.

Multiply 542×8 .

TH	H	T	O
	5	4	2
			$\times 8$

$$\begin{array}{r} 542 \\ \times 8 \\ \hline \end{array}$$



Check your answers in the Appendix.

5. Multiply 814×3 . Use a place-value chart. Then multiply without one.



Check your answers in the Appendix.

6. Find the products for the following using the long form for multiplication. Use a place-value chart only if you need to.

a.
$$\begin{array}{r} 749 \\ \times 7 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 368 \\ \times 9 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 294 \\ \times 4 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 453 \\ \times 7 \\ \hline \end{array}$$



Check your answers in the Appendix.

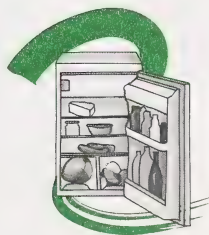
Estimating with Large Numbers

When multiplying large numbers, estimating is helpful. If you can round and multiply mentally, you can see if your answer is reasonable.

Example

Six fridges weigh 115 kg each. How much do they weigh altogether?

First, estimate so that you have a rough idea of what your answer should be.



Start by rounding 115 kg to 100 kg and then use mental math to multiply.

$$6 \times 100 \text{ kg} = 600 \text{ kg}$$

The **estimate** is 600 kg.

Now find the **actual weight** of the fridges.

$$\begin{array}{r} 115 \\ \times 6 \\ \hline 30 \\ 60 \\ + 600 \\ \hline 690 \end{array}$$

The estimate of 600 kg is fairly close. The actual weight is 690 kg.



Why do you estimate?

The reason you estimate is to have an idea of what the product will be.

If you have to use pencil and paper, you are defeating the purpose of estimating. Estimating should be done quickly in your head! Estimating can also be used to check your answer **after** you have found a product.

7. For each of the following questions, round the three-digit number to the nearest 100 and give an **estimate** of the product. Then find the **actual product** by multiplying. Two examples are done for you.

Example 1: $9 \times 412 =$

Estimate

Round 412 to 400.

$$9 \times 400 = 3600$$

The estimate is 3600.

Actual Product

$$\begin{array}{r} 412 \\ \times 9 \\ \hline 18 \\ 90 \\ \hline 3600 \\ 3708 \end{array}$$

Example 2: $7 \times 281 =$

Estimate

Round 281 to 300.

$$7 \times 300 = 2100$$

The estimate is 2100.

Actual Product

$$\begin{array}{r} 281 \\ \times 7 \\ \hline 7 \\ 560 \\ \hline 1400 \\ 1967 \end{array}$$

a. $7 \times 436 =$

Estimate

Actual Product

b. $8 \times 392 =$

Estimate

Actual Product



Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 17.





Using the Short Form to Multiply Large Numbers

In previous lessons, you learned to multiply two-digit numbers by one-digit numbers using the short method.

To multiply a three-digit number by a one-digit number, the same method is followed. There are only two more steps.

Look at the following examples.

Example 1

Multiply 658×3 .

Step 1: Multiply the ones. ($3 \times 8 = 24$)

Step 2: Place the 4 below the line in the Ones column and regroup the 2 to the tens column. Write a small 2 above the 5.

TH	H	T	O
	¹ 6	² 5	8
			$\times 3$
1	9	7	4

Step 3: Multiply $3 \times 5 = 15$ and then **add** the regrouped 2. ($15 + 2 = 17$)

Step 4: Place the 7 below the line in the Tens column and regroup the 1 to the Hundreds column. Write a small 1 above the 6.

Step 5: Multiply $3 \times 6 = 18$ and **add** the regrouped 1. ($18 + 1 = 19$)

Step 6: Place the 9 below the line in the Hundreds column and the 1 in the Thousands column.

Step 7: The answer is $658 \times 3 = 1974$.

Example 2

Multiply 546×6 .

Step 1: Multiply the ones. ($6 \times 6 = 36$)

Step 2: Write the 6 below the line in the Ones column and regroup the 3 to the Tens column. Write a small 3 above the 4.

TH	H	T	O
	² 5	³ 4	6
			$\times 6$
3	2	7	6

Step 3: Multiply $6 \times 4 = 24$ and then **add** the regrouped 3. ($24 + 3 = 27$)

Step 4: Write the 7 below the line in the Tens column and regroup the 2 to the Hundreds column. Write a small 2 above the 5.

Step 5: Multiply $6 \times 5 = 30$ and then add the regrouped 2. ($30 + 2 = 32$)

Step 6: Write the 2 below the line in the Hundreds column and the 3 in the Thousands column.

Step 7: The answer is $546 \times 6 = 3276$.

It's your turn to multiply!

1. Find the product of 876×7 . Use a place-value chart.

TH	H	T	O
	8	7	6
			$\times 7$



Check your answers in the Appendix.

2. Find the product of 597×9 by using a place-value chart.

TH	H	T	O



Check your answers in the Appendix.

Checking Products by Estimating

3. For each of the following questions, find the actual product. Then check how reasonable your answer is by estimating. Round the three-digit factor to the nearest hundred. An example has been done for you.

Example: $919 \times 2 =$

Actual Product

$$\begin{array}{r} 1 \\ 919 \\ \times 2 \\ \hline 1838 \end{array}$$

Estimate

Round 919 to 900.

$$900 \times 2 = 1800$$

a. $392 \times 6 =$

Actual Product

Estimate

b. $837 \times 8 =$

Actual Product

Estimate

c. $456 \times 6 =$

Actual Product

Estimate

d. $239 \times 7 =$

Actual Product

Estimate



Check your answers in the Appendix.

If there is a zero as part of a product, be sure to include it.

- a zero in the ones place

$$\begin{array}{r} 22 \\ 354 \\ \times 5 \\ \hline 1770 \end{array}$$

The zero tells that there are zero ones.

- a zero in the tens place

$$\begin{array}{r} 1 \\ 821 \\ \times 5 \\ \hline 4105 \end{array}$$

The zero tells that there are zero tens.

- a zero in the hundreds place

$$\begin{array}{r} 3 \\ 519 \\ \times 4 \\ \hline 2076 \end{array}$$

The zero tells that there are zero hundreds.

4. Multiply the following numbers. Include any zeros you find in the product.

a.
$$\begin{array}{r} 365 \\ \times 8 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 167 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c. } 684 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d. } 258 \\ \times 7 \\ \hline \end{array}$$



Check your answers in the Appendix.

Problem Solving



Before solving a word problem, you should estimate the answer. This will help you check that your actual answer is reasonable.

Example

Johnny is 7 years old. How many days old is Johnny?

Estimate

Round 365 to 400.

$$400 \times 7 = 2800$$

Actual Product

$$\begin{array}{r} 43 \\ 365 \\ \times 7 \\ \hline 2555 \end{array}$$

Johnny is 2555 days old.

Estimate to help you solve the following problems.

5. a.



An office building has 8 floors. Each floor has 325 telephones. How many telephones are there in the office building?

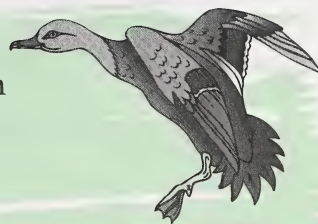
Estimate

Actual Product

Sentence answer: _____

b.

A bird migrating south is able to fly 465 km a day. How far can it fly in 8 days?



Estimate

Actual Product

Sentence answer: _____

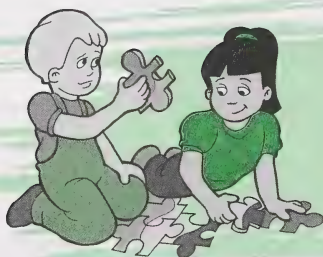
- c. An aquarium holds 322 L of water. How many litres will be in 6 aquariums of the same size?

Estimate

Actual Product

Sentence answer: _____

d.



Collette has 4 jigsaw puzzles. Each puzzle has 475 pieces. How many pieces are there altogether?

Estimate

Actual Product

Sentence answer: _____

Check your answers in the Appendix.



Mental Math: Easy Pairs



Easy pairs are numbers that are easy to multiply. For example, multiples of 10, such as 10, 20, 50, and 100, are easy to work with.

When multiplying three or more factors, always look for factors that are easy to multiply. You should identify these factors and write them in brackets.

Example 1

$$5 \times 9 \times 2 = \square$$

This is easy to multiply if you rearrange the order.

$$\begin{aligned}(5 \times 2) \times 9 &= 10 \times 9 \\ &= 90\end{aligned}$$

Example 2

$$6 \times 8 \times 5 = \square$$

$$\begin{aligned}(6 \times 5) \times 8 &= 30 \times 8 \\ &= 240\end{aligned}$$

Example 3

Mentally multiply $5 \times 7 \times 2 \times 5 \times 4$.

$$\begin{aligned}\text{Change the order to } (5 \times 2) \times (5 \times 4) \times 7 &= 10 \times 20 \times 7 \\ &= (10 \times 20) \times 7 \\ &= 200 \times 7 \\ &= 1400\end{aligned}$$

6. Mentally find these products. Look for easy pairs and rearrange the factors.

a. $2 \times 7 \times 5 =$

What is the easy pair? _____

Rearrange the factors. _____

Find the product. _____

Check your answers in the Appendix.

b. $2 \times 9 \times 15 =$

What is the easy pair? _____

Rearrange the factors. _____

Find the product. _____

7. $4 \times 8 \times 50 =$

8. $25 \times 5 \times 4 \times 5 =$



9. $15 \times 3 \times 2 \times 2 \times 15 =$



Check your answers in the Appendix.

Basic Number Facts Practice



Ask your home instructor to time you as you complete the following exercise. Your goal is to complete all 25 questions in 2 minutes. At the end of 2 minutes, count up how many questions you were able to complete. Write this number in the chart below. Then use the answer key in the Appendix to mark the exercise, and record your score in the space provided. Before you move on, go back and complete any questions you did not finish during the 2 minutes. Mark these questions using the answer key as well.

Basic Number Facts Practice

Multiplication Number Facts

Number Completed in 2 Minutes _____

Number Correct in 2 Minutes _____

Record your score on the Number Facts Progress Chart.

10. Multiplication Number Facts

Timed Exercise: 2 minutes

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$9 \times 9 =$

$7 \times 5 =$

$8 \times 4 =$

$5 \times 8 =$

$6 \times 6 =$

$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

$9 \times 7 =$

$6 \times 8 =$

$5 \times 6 =$

$8 \times 6 =$

$7 \times 7 =$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$$

Check your answers in the Appendix.





Taking Another Look

The following activities are optional. You may choose to do them or not. You **should** complete the activities if you had difficulty multiplying three-digit numbers by one-digit numbers, or if you feel you just need more practice.

If you choose not to do the questions at this time, you may wish to return here later to review the concepts on multiplying three-digit numbers before completing the review activities for Day 19.

The Short Form of Multiplying Three-Digit Numbers by One-Digit Numbers

Step 1:

$$\begin{array}{r} 324 \\ \times 6 \\ \hline 4 \end{array}$$

($6 \times 4 = 24$ or 2 tens and 4 ones)

Step 2:

$$\begin{array}{r} 12 \\ 324 \\ \times 6 \\ \hline 44 \end{array}$$

($6 \times 2 \text{ tens} = 12 \text{ tens} + 2 \text{ more tens} = 14 \text{ tens or 1 hundred and 4 tens}$)

Step 3:

$$\begin{array}{r} 12 \\ 324 \\ \times 6 \\ \hline 1944 \end{array}$$

($6 \times 3 \text{ hundreds} = 18 \text{ hundreds} + 1 \text{ hundred} = 19 \text{ hundreds} = 9 \text{ hundreds and 1 thousand}$)

11. Find the product. Follow along with the steps shown below to complete the calculation.

$$\begin{array}{r} 321 \\ \times 6 \\ \hline \end{array}$$

- Multiply the ones first. ($6 \times 1 = 6$)
Write **6** in the ones column below the line.
- Multiply the tens. ($6 \times 2 = 12$)
Write **2** in the tens column below the line.
Write a small **1** above the 3 in the hundreds column.
- Multiply the hundreds. ($6 \times 3 = 18$)
- Add the extra hundreds to the product. ($18 + 1 = 19$)
Write **9** in the hundreds column and **1** in the thousands column.



Check your answer in the Appendix.

12. Use the short form for multiplication to find these products. Show how you regroup.

a.
$$\begin{array}{r} 765 \\ \times 7 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 987 \\ \times 9 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 364 \\ \times 6 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 702 \\ \times 8 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 403 \\ \times 5 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 760 \\ \times 4 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 359 \\ \times 8 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 208 \\ \times 3 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 587 \\ \times 4 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 405 \\ \times 3 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 648 \\ \times 5 \\ \hline \end{array}$$

l.
$$\begin{array}{r} 780 \\ \times 8 \\ \hline \end{array}$$

m.
$$\begin{array}{r} 754 \\ \times 9 \\ \hline \end{array}$$

n.
$$\begin{array}{r} 998 \\ \times 7 \\ \hline \end{array}$$

o.
$$\begin{array}{r} 384 \\ \times 6 \\ \hline \end{array}$$

p.
$$\begin{array}{r} 803 \\ \times 5 \\ \hline \end{array}$$

q.
$$\begin{array}{r} 315 \\ \times 7 \\ \hline \end{array}$$

r.
$$\begin{array}{r} 842 \\ \times 9 \\ \hline \end{array}$$

s.
$$\begin{array}{r} 666 \\ \times 6 \\ \hline \end{array}$$

t.
$$\begin{array}{r} 211 \\ \times 3 \\ \hline \end{array}$$



Check your answers in the Appendix.

Turn to Assignment Booklet 5B, and complete the activities for Day 18.





Putting It All Together (II)



In Section 2 you learned many new things about multiplication and how it is used. You learned

- how to solve problems using the Looking for a Pattern strategy
- how to multiply two- and three-digit numbers by one-digit numbers using
 - base ten blocks
 - expanding numbers
 - the long form for multiplication
 - the short form for multiplication
- to estimate using multiplication

Today you will show what you know about multiplication by completing several review questions. You will then work on a Challenge Activity related to multiplication.

Part 1: Reviewing the Concepts

For Part 1 you will complete the review questions for Day 19 in Assignment Booklet 5B. First, you may wish to look back through the Student Module Booklet to review the concepts covered in Section 2.

Part 2: Challenge Activities

The Challenge Activities in Part 2 are designed to extend the ideas you have been learning and encourage you to explore new ideas about multiplication. In your Assignment Booklet you will find two Challenge Activities. Choose **either** Activity A **or** Activity B (**or** you may do both if you wish).

Turn to Day 19 in Assignment Booklet 5B, and complete all of the review questions in Part 1. Then do one or both of the Challenge Activities in Part 2.





Assessing What You Know (II)

This is the last day you will be working on Module 5: Multiplication. Today you will complete **three** activities in Assignment Booklet 5B:

- Showing What You Can Do
- Basic Number Facts
- Thinking About What You Know

Read the explanation of the activities for all three parts before turning to the Assignment Booklet. Note that you will need help from your home instructor for activities in Parts 1 and 2.



Part 1: Showing What You Can Do



For this activity you will need the help of your home instructor. You will be working on a short activity while your home instructor observes you. As you work through the problem, try to explain clearly what you are doing.

Your home instructor may ask you questions like the following:

- “How do you know that?”
- “Why did you decide to do that?”
- “How did you get that answer?”

Your job is to explain what you are doing so that your home instructor can understand your thinking.



Note to the Home Instructor

This performance assessment should take about 15 minutes. The Home Instructor’s Assessment Page and accompanying Student’s Assessment Page can be found in Day 20 of Assignment Booklet 5B. Remove both pages from the Assignment Booklet. Read over the student’s assigned task. You should also preview the interview questions and the checklist before the student begins working on the assigned task.

As the student works to answer the questions, encourage him or her to talk about what he or she is doing. **Allow the student to use any manipulatives or cut-out learning aids available to help solve the problem.** You may or may not wish to use some of the interview questions. Look for understanding and the student’s ability to explain clearly what he or she is doing to arrive at an answer. Indicate on the checklist whether you feel the student demonstrated the skills being assessed.

Attach both assessment pages to the Assignment Booklet before sending it in for marking.

Part 2: Basic Number Facts



In this activity you will show how well you are doing at learning your basic number facts for multiplication. Ask your home instructor to time you as you do each test.

Part 3: Thinking About What You Know

In this activity you will spend some time looking back over the Student Module Booklet. Then you will complete some statements that tell about things you liked about this section of the module, things you didn't understand, and things you would like to learn more about. This information will be helpful to your teacher in determining how well you understood the information presented in the module.

When your home instructor is ready, turn to Assignment Booklet 5B, and complete the activities found in Parts 1, 2, and 3 of Day 20.



This is the end of Section 2. Check over Assignment Booklet 5B to make sure you have completed all of the assigned activities for each day. Remember that for Day 19 you need to complete the review questions in Part 1 and one or both Challenge Activities in Part 2.



Be sure to attach the two assessment pages from Day 20 to Assignment Booklet 5B. Then send Assignment Booklet 5B to your teacher.



Appendix

Glossary

Answer Key to Self-Marking Activities

Cut-Out Learning Aids

Number Facts Progress Chart



Glossary

arithmetic sentence: a sentence that involves addition, subtraction, multiplication, or division

array: a group of objects arranged in rows and columns

digit: any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 used to write numbers

easy pairs: pairs of numbers that are easy to multiply

Example: 5×2

estimate: to make a careful guess that is close to the actual value without calculating it exactly

even number: a whole number that can be divided by 2 without a remainder

Numbers ending in 0, 2, 4, 6, and 8 are even numbers. Examples of even numbers are 32, 188, and 604.

expanded form: a way of writing a number so that the place value of each digit is shown

$$674 = 600 + 70 + 4$$

factor: any of the numbers used to form the product of another number

For example, 3 and 4 are factors of 12 ($3 \times 4 = 12$).

grouping property for multiplication: Changing the grouping of the factors does not change the product.

For example, $(2 \times 3) \times 4 = 2 \times (3 \times 4)$

$$6 \times 4 = 2 \times 12$$

$$24 = 24$$

multiple: the number you get when you multiply a number by 1, 2, 3, 4, 5, and so on

The number 12 is a multiple of 4 because 4 can be multiplied by 3 to get 12. ($4 \times 3 = 12$)

multiplication fact: the factors multiplied to give a product

For example, $7 \times 3 = 21$ is a multiplication fact.

multiplication sentence: the factors multiplied to give a product

For example, $3 \times 81 = 243$ is a multiplication sentence.

odd number: a whole number that cannot be divided by 2 without a remainder

Numbers ending in 1, 3, 5, 7, and 9 are odd numbers. Examples of odd numbers are 15, 63, 121, and 639.

order property for multiplication:

When two numbers are multiplied, changing the order of the factors does not change the product.

$$7 \times 3 = 3 \times 7$$

$$21 = 21$$

pattern: a repeating design of colours, lines, shapes, figures, sounds, words, letters, or numbers

The arrangement usually allows you to predict how the pattern will continue.

product: the number arrived at when two or more numbers are multiplied

For example, 27 is the product of 3×9 .

rounded number: a number that is approximately equal to a given number

For example, 5349

- rounded to the nearest ten is 5350
- rounded to the nearest hundred is 5300
- rounded to the nearest thousand is 5000

skip counting: counting in a pattern by omitting numbers

Examples:

- counting by 2s: 2, 4, 6, 8, 10, ...
- counting by 3s: 3, 6, 9, 12, ...

square number: the product of a number multiplied by itself

Examples:

$$2 \times 2 = 4$$

$$6 \times 6 = 36$$

The numbers 4 and 36 are square numbers.

T-table: a table of data with two columns

zero property for multiplication: The product of zero and any number is always zero.

Answer Key to Self-Marking Activities

Day 1: Addition and Multiplication

1. a. 

b. $3 + 3 + 3 + 3 + 3 + 3 + 3 = 21$

c. $7 \times 3 = 21$

2. a. Addition sentence: $9 + 9 + 9 = 27$
Multiplication sentence: $3 \times 9 = 27$

b. 

3. **Quest 2000** Page 93

On Your Own, Questions 1, 2, 3, and 4

1. Addition sentence: $3 + 3 = 6$

Multiplication sentence: $2 \times 3 = 6$

2. Addition sentence: $4 + 4 + 4 + 4 + 4 = 20$

Multiplication sentence: $5 \times 4 = 20$

3. Addition sentence: $6 + 6 + 6 + 6 + 6 + 6 = 36$

Multiplication sentence: $6 \times 6 = 36$

4. Addition sentence: $5 + 5 + 5 + 5 + 5 + 5 = 30$

Multiplication sentence: $6 \times 5 = 30$

4. Addition sentence: $6 + 6 + 6 + 6 + 6 + 6 + 6 = 42$

Multiplication sentence: $7 \times 6 = 42$

5. $9 \times 7 = 63$

6.

\times	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

7. a. $2 \times 7 = 14$ b. $8 \times 4 = 32$ c. $9 \times 6 = 54$ d. $7 \times 10 = 70$
e. $10 \times 7 = 70$ f. $8 \times 9 = 72$ g. $6 \times 6 = 36$ h. $9 \times 9 = 81$

Day 2: Understanding Multiplying

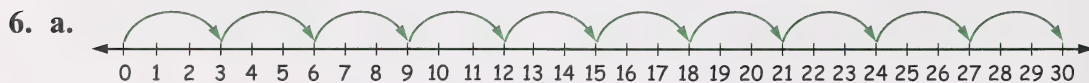
1. a. The number 6 is a **factor**.
b. The number 2 is a **factor**.
c. The number 12 is a **product**.

2. a. factor b. product
c. product d. factor

3. a. Find the row that begins with 4. Find the fifth column. See where they meet.
 b. $4 \times 5 = 20$
 c. The factors are 4 and 5.
4. a. Find the row that begins with 8. Find the seventh column. See where they meet.
 b. $8 \times 7 = 56$
 c. The factors are 8 and 7.

5.

Skip Count	Multiplication Sentence
2	$1 \times 2 = 2$
4	$2 \times 2 = 4$
6	$3 \times 2 = 6$
8	$4 \times 2 = 8$
10	$5 \times 2 = 10$
12	$6 \times 2 = 12$
14	$7 \times 2 = 14$
16	$8 \times 2 = 16$
18	$9 \times 2 = 18$
20	$10 \times 2 = 20$



- b. You are adding 3.

c.

Skip Count	Multiplication Sentence
3	$1 \times 3 = 3$
6	$2 \times 3 = 6$
9	$3 \times 3 = 9$
12	$4 \times 3 = 12$
15	$5 \times 3 = 15$
18	$6 \times 3 = 18$
21	$7 \times 3 = 21$
24	$8 \times 3 = 24$
27	$9 \times 3 = 27$
30	$10 \times 3 = 30$

7. a. 4, 8, 12, 16, 20, 24, 28, 32, 36, 40
b. I skip counted by 4. Each time, I added 4 more.
8. a. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
b. I noticed that the numbers increase by 5.
9. a. 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
b. I noticed that the numbers increase by 8.

10. a. 3, 6, 9, 12, 15, 18

b. The numbers increase by 3 as if I were skip counting.

11. 5, 10, 15, 20, 25, 30

12. 6, 12, 18, 24, 30, 36

13. a. Each number is even.

b. When you multiply by 2, the product will always be an even number.

14. a. 12

b. 8

c. 18

d. 10

e. 2

f. 14

g. 6

h. 0

i. 4

j. 16

15. a. and b.

Skip Count	Multiplication Sentence
5	$1 \times 5 = 5$
10	$2 \times 5 = 10$
15	$3 \times 5 = 15$
20	$4 \times 5 = 20$
25	$5 \times 5 = 25$
30	$6 \times 5 = 30$
35	$7 \times 5 = 35$
40	$8 \times 5 = 40$
45	$9 \times 5 = 45$
50	$10 \times 5 = 50$

16. Multiplication Number Facts

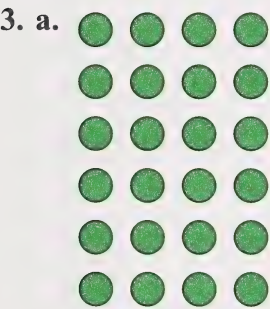
21	35	9	36	72
4	27	64	36	56
24	49	36	12	42
15	28	18	30	14
32	54	24	16	25

Day 3: Arrays and Multiplying

- 1. a. $5 + 5 + 5 + 5 = 20$
b. 5, 10, 15, 20
c. $4 \times 5 = 20$



- b. Repeated addition: $6 + 6 + 6 = 18$
Skip counting: 6, 12, 18
Multiplication: $3 \times 6 = 18$



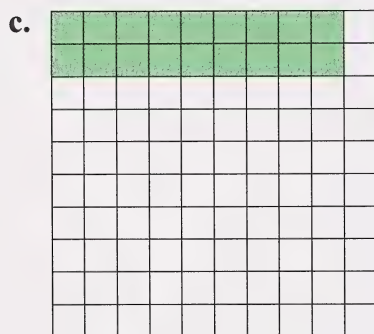
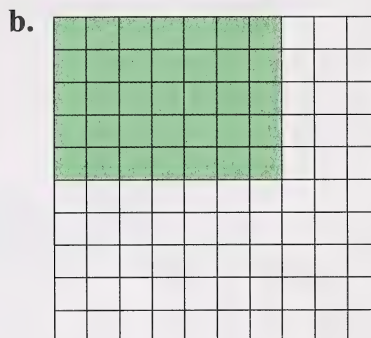
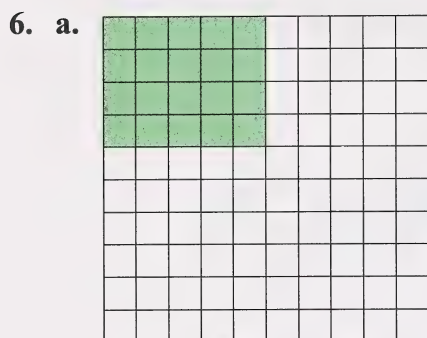
Addition sentence: $4 + 4 + 4 + 4 + 4 + 4 = 24$
Multiplication sentence: $6 \times 4 = 24$



Addition sentence: $9 + 9 + 9 = 27$
Multiplication sentence: $3 \times 9 = 27$

4. • $2 \times 3 = 6$
 • $3 \times 2 = 6$
 • $2 \times 3 = 3 \times 2$

5. a. • $7 \times 8 = 56$
 • $8 \times 7 = 56$
 • $7 \times 8 = 8 \times 7$
- b. • $2 \times 6 = 12$
 • $6 \times 2 = 12$
 • $2 \times 6 = 6 \times 2$



7. Yes, the answer will still be zero because the product of zero and any number is zero.

8. a. $0 \times 7 = 0$ b. $4 \times 0 = 0$ c. $0 \times 67 = 0$ d. $99 \times 0 = 0$

9.
 Four green circles, each containing an 'X'.

Multiplication sentence: $4 \times 1 = 4$

10. a. $1 \times 2 = 2$ b. $1 \times 6 = 6$ c. $1 \times 5 = 5$

11. a. $5 \times 1 = 5$ b. $1 \times 8 = 8$
c. $1 \times 1 = 1$ d. $26 \times 1 = 26$

Day 4: Different Arrays, Same Product

1. a. 

b. $1 \times 12 = 12$

c. 

d. $12 \times 1 = 12$

e. $1 \times 12 = 12 \times 1$



b. $2 \times 6 = 12$

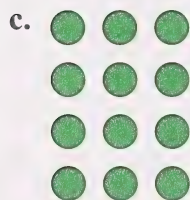


d. $6 \times 2 = 12$

e. $2 \times 6 = 6 \times 2$



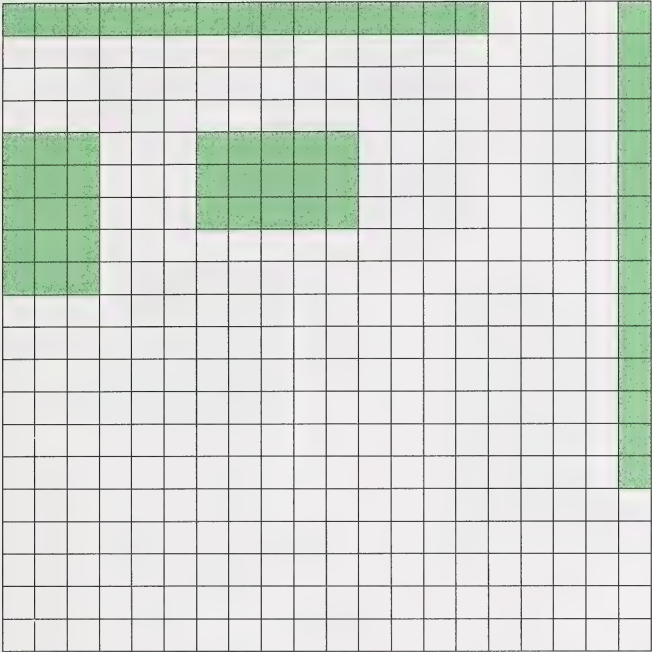
b. $3 \times 4 = 12$



d. $4 \times 3 = 12$

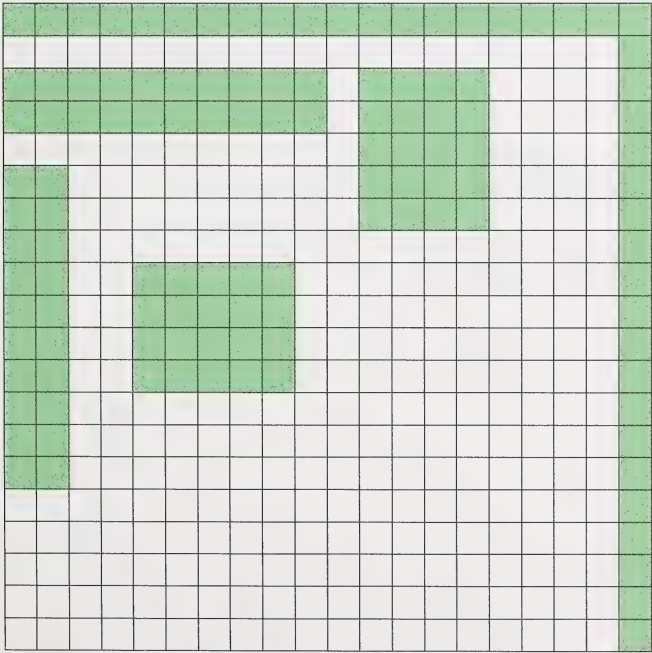
e. $3 \times 4 = 4 \times 3$

4. a.



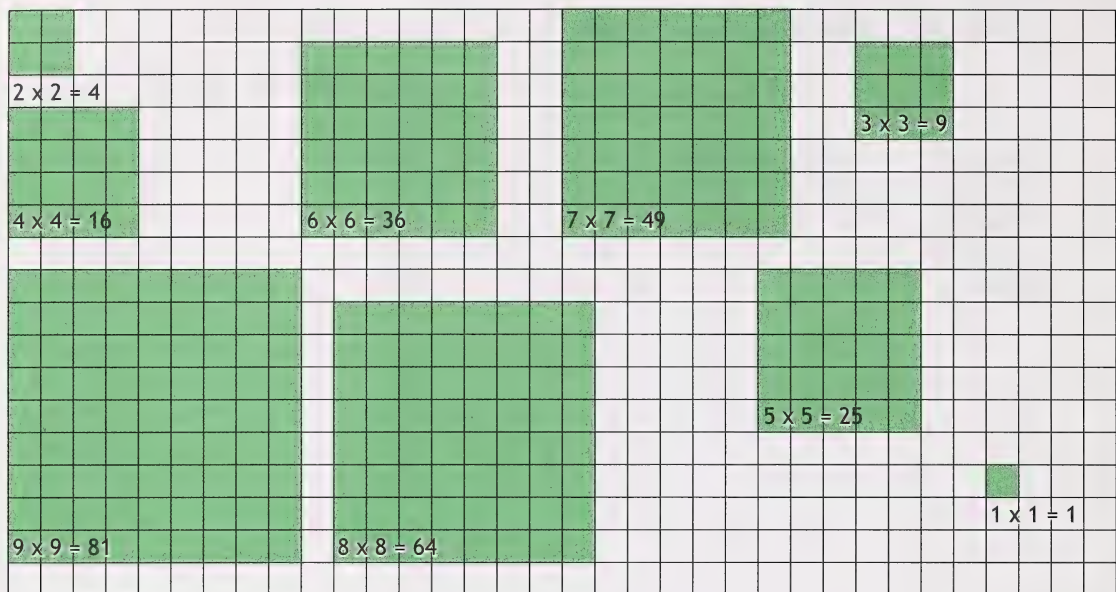
- b.
- $1 \times 15 = 15$
 - $15 \times 1 = 15$
 - $3 \times 5 = 15$
 - $5 \times 3 = 15$

5. a. These are the possible arrays for 20.



- b.
- $4 \times 5 = 20$
 - $5 \times 4 = 20$
 - $2 \times 10 = 20$
 - $10 \times 2 = 20$
 - $1 \times 20 = 20$
 - $20 \times 1 = 20$

6.



7. a. 25 b. 9 c. 36 d. 4 e. 16
 f. 64 g. 1 h. 81 i. 49

Taking Another Look

8. a. $8 \times 7 = 56$ b. $9 \times 9 = 81$
 c. $7 \times 9 = 63$ d. $6 \times 4 = 24$
 e. $6 \times 6 = 36$ f. $4 \times 8 = 32$
 g. $8 \times 5 = 40$ h. $9 \times 6 = 54$
 i. $6 \times 8 = 48$ j. $5 \times 5 = 25$
 k. $9 \times 5 = 45$ l. $8 \times 8 = 64$

Day 5: Splitting Arrays

1. a. • $1 \times 6 = 6$
 • $4 \times 6 = 24$

b. $5 \times 6 = (1 \times 6) + (4 \times 6)$
 $= 6 + 24$
 $= 30$

2. a. • $2 \times 6 = 12$

• $3 \times 6 = 18$

b. $5 \times 6 = (2 \times 6) + (3 \times 6)$

$= 12 + 18$

$= 30$

3. • $6 \times 7 = (1 \times 7) + (5 \times 7)$

$= 7 + 35$

$= 42$

• $6 \times 7 = (2 \times 7) + (4 \times 7)$

$= 14 + 28$

$= 42$

• $6 \times 7 = (3 \times 7) + (3 \times 7)$

$= 21 + 21$

$= 42$

4. a. 7 fives is the same as 6 fives and 1 five.

b. 7 fives is the same as 5 fives and 2 fives.

c. 7 fives is the same as 4 fives and 3 fives.

5. a. $7 \times 5 = (6 \times 5) + (1 \times 5)$

b. $7 \times 5 = (5 \times 5) + (2 \times 5)$

c. $7 \times 5 = (4 \times 5) + (3 \times 5)$

6. a. 8 fives is the same as 7 fives and 1 five.

b. 8 fives is the same as 6 fives and 2 fives.

c. 8 fives is the same as 5 fives and 3 fives.

d. 8 fives is the same as 4 fives and 4 fives.

7. a. $8 \times 5 = (7 \times 5) + (1 \times 5)$

$= 35 + 5$

$= 40$

b. $8 \times 5 = (6 \times 5) + (2 \times 5)$

$= 30 + 10$

$= 40$

c. $8 \times 5 = (5 \times 5) + (3 \times 5)$

$= 25 + 15$

$= 40$

d. $8 \times 5 = (4 \times 5) + (4 \times 5)$

$= 20 + 20$

$= 40$

8. a. Any of these three answers is possible.

$$\begin{aligned} 6 \times 6 &= (5 \times 6) + (1 \times 6) \\ &= 30 + 6 \\ &= 36 \end{aligned}$$

$$\begin{aligned} 6 \times 6 &= (4 \times 6) + (2 \times 6) \\ &= 24 + 12 \\ &= 36 \end{aligned}$$

$$\begin{aligned} 6 \times 6 &= (3 \times 6) + (3 \times 6) \\ &= 18 + 18 \\ &= 36 \end{aligned}$$

b. Any of these three answers is possible.

$$\begin{aligned} 7 \times 8 &= (6 \times 8) + (1 \times 8) \\ &= 48 + 8 \\ &= 56 \end{aligned}$$

$$\begin{aligned} 7 \times 8 &= (5 \times 8) + (2 \times 8) \\ &= 40 + 16 \\ &= 56 \end{aligned}$$

$$\begin{aligned} 7 \times 8 &= (4 \times 8) + (3 \times 8) \\ &= 32 + 24 \\ &= 56 \end{aligned}$$

9. a. 10

b. 20

c. 30

d. 40

e. 50

f. 60

g. 70

h. 80

i. 90

j. 100

10. When I multiply by 10, I attach a zero to the number I am multiplying by 10.

11. a. 230

b. 460

c. 890

d. 1000

e. 4310

f. 9990

12. a. A zero is attached each time.

b. 2 zeros

13. a. 500

b. 3300

c. 1200

14. a. 500

b. 4300

c. 6700

d. 5900

e. 8700

f. 8890

15. Multiplication Number Facts

56	36	8	18	49
72	24	64	56	48
32	54	40	9	45
35	27	72	48	63
16	28	45	81	36

Day 6: Splitting Larger Arrays

1. a. • 3×5

• 3×6

b. $3 \times 5 = 15$ There are 15 chocolate muffins.

c. $3 \times 6 = 18$ There are 18 bran muffins.

d. $15 + 18 = 33$ There are 33 muffins altogether.

e. $(3 \times 5) + (3 \times 6)$

$= 15 + 18$

$= 33$ muffins

2. a. • 5×4

• 5×3

b. $5 \times 4 = 20$ There are 20 cans of chicken soup.

c. $5 \times 3 = 15$ There are 15 cans of tomato soup.

d. $20 + 15 = 35$ There are 35 cans of soup altogether.

e. $(5 \times 4) + (5 \times 3)$

$= 20 + 15$

$= 35$ cans of soup

3. $(3 \times 6) + (3 \times 7)$

$= 18 + 21$

$= 39$ doughnuts

4. a. Your estimate should be between 40 and 80.

- b. There are many methods that you could have used to estimate. One method is shown.

4×16 is about halfway between 4×10 and 4×20 .

$$4 \times 10 \rightarrow (40)$$

\vdots

$$4 \times 16 \rightarrow (?)$$

\vdots

$$4 \times 20 \rightarrow (80)$$

Sixty is halfway between 40 and 80. Therefore, a good estimate would be about 60 objects.

$$\begin{aligned} 5. \quad & (4 \times 8) + (4 \times 8) \\ &= 32 + 32 \\ &= 64 \end{aligned}$$

There are 64 objects in this array.

6. Several answers are possible. It is often a good idea to split the array so that one part has a 10 in it, as it is easy to multiply and add numbers with a zero in them.

$$\begin{aligned} & (4 \times 6) + (4 \times 10) \\ &= 24 + 40 \\ &= 64 \end{aligned}$$

7. a. Many answers are possible. Your estimate should be between 50 and 100. The array 5×18 is close to but smaller than 5×20 .

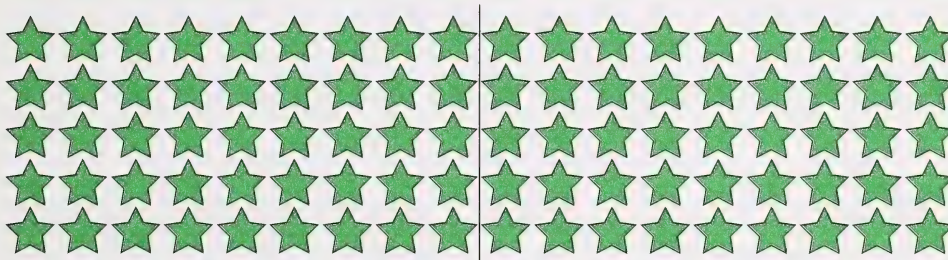
$$5 \times 20 = 100$$

A closer estimate would be a number between 75 and 100.

b. 5×18



c.



$$5 \times 9 = 45$$

$$5 \times 9 = 45$$

d. $(5 \times 9) + (5 \times 9)$

$$= 45 + 45$$

$$= 90$$

e. • $5 \times 10 = 50$

• $5 \times 8 = 40$

f. $(5 \times 10) + (5 \times 8)$

$$= 50 + 40$$

$$= 90$$

8. a. $6 \times 40 = 240$

c. $7 \times 70 = 490$

e. $8 \times 700 = 5600$

b. $9 \times 900 = 8100$

d. $300 \times 4 = 1200$

f. $30 \times 8 = 240$

Taking Another Look

9. a. • $6 \times 4 = 24$

• $6 \times 4 = 24$

b. $(6 \times 4) + (6 \times 4)$

$= 24 + 24$

$= 48$

10. a. • $4 \times 3 = 12$

• $4 \times 4 = 16$

b. $(4 \times 3) + (4 \times 4)$

$= 12 + 16$

$= 28$

11. a. 9 eights is the same as 7 eights + 2 eights .

b. 9 eights is the same as 6 eights + 3 eights .

c. 9 eights is the same as 5 eights + 4 eights .

12. a. $7 \text{ eights} + 2 \text{ eights} = (7 \times 8) + (2 \times 8)$

$= 56 + 16$

$= 72$

b. $6 \text{ eights} + 3 \text{ eights} = (6 \times 8) + (3 \times 8)$

$= 48 + 24$

$= 72$

c. $5 \text{ eights} + 4 \text{ eights} = (5 \times 8) + (4 \times 8)$

$= 40 + 32$

$= 72$

Day 7: Multiples

1. a. $3 \times 1 = 3$ $3 \times 2 = 6$ $3 \times 3 = 9$ $3 \times 4 = 12$ $3 \times 5 = 15$

b. Yes, 24 is a multiple of 3 because $3 \times 8 = 24$.

c. No, 20 is not a multiple of 3 because there is no number that can be multiplied by 3 to equal 20.

2. a. $1 \times 8 = 8$ $2 \times 8 = 16$ $3 \times 8 = 24$ $4 \times 8 = 32$ $5 \times 8 = 40$

b. No, 36 is not a multiple of 8 because there is no number that can be multiplied by 8 to equal 36.

c. Yes, 48 is a multiple of 8 because $8 \times 6 = 48$.

3. a. $1 \times 6 = 6$ $2 \times 6 = 12$ $3 \times 6 = 18$ $4 \times 6 = 24$ $5 \times 6 = 30$ $6 \times 6 = 36$

b. No, 35 is not a multiple of 6 because there is no number that can be multiplied by 6 to equal 35.

c. Yes, 54 is a multiple of 6 because $6 \times 9 = 54$.

4. a. They are multiples of 5 because $5 \times 2 = 10$, $5 \times 6 = 30$, $5 \times 5 = 25$, and $5 \times 10 = 50$.

b. No, 41 is not a multiple of 5. There is no number that can be multiplied by 5 to equal 41.

c. There are many answers, such as 15, 20, 45, 55, and 100.

5. a. 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

b. They are all even numbers. Each one is 2 more than the previous one.

c. $11 \times 2 = 22$ $12 \times 2 = 24$

- d. I know that $10 \times 2 = 20$, so 2 more than 20 is 22. The number 22 is an even number.

I know that $10 \times 2 = 20$, so 4 more than 20 is 24. The number 24 is an even number.

6. a. The pattern is 0, 5, 0, 5, 0, 5, and so on. Each one is 5 more.

- b. $5 \times 11 = 55$ because $5 \times 10 = 50$. The next number must end in a 5 and be 5 more than 50.

$5 \times 12 = 60$ because $5 \times 11 = 55$. The next number must end in a 0 and be 5 more than 55.

7. a. The one's digit is 1 less each time and the ten's digit is 1 more.

- b. 9×11 will be 99 because the pattern begins again.

9, 18, 27, 36, 45, 54, 63, 72, 81, 90 \rightarrow 99

OR $9 \times 11 = (9 \times 10) + 9 = 90 + 9 = 99$

9×12 will be 108 because the pattern continues 99, 108

OR $9 \times 12 = (9 \times 10) + (2 \times 9) = 90 + 18 = 108$

8. a.



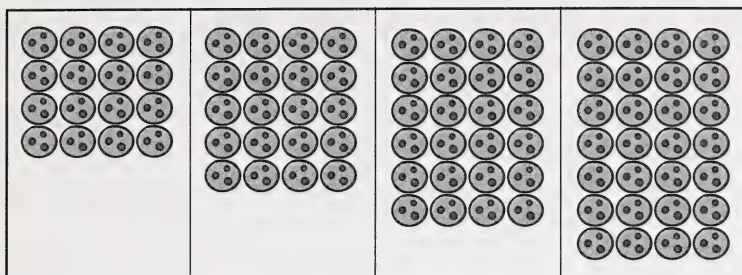
$5 \times 3 = 15$



$6 \times 3 = 18$

- b. There are three squares in each row.
c. There are six rows.
d. $6 \times 3 = 18$ squares

9. a.



$$4 \times 4 = 16$$

$$5 \times 4 = 20$$

$$6 \times 4 = 24$$

$$7 \times 4 = 28$$

b. 28 cookies

10. a. Even numbers end in 0, 2, 4, 6, and 8.

b. Odd numbers end in 1, 3, 5, 7, and 9.

11. a.

\times	8 (even)	7 (odd)
4 (even)	32	28
5 (odd)	40	35

b.

\times	6 (even)	9 (odd)
6 (even)	36	54
7 (odd)	42	63

12. a. $\text{odd} \times \text{odd} = \text{odd}$

b. $\text{even} \times \text{even} = \text{even}$

c. $\text{even} \times \text{odd} = \text{even}$

d. $\text{odd} \times \text{even} = \text{even}$

13. a. even

b. even

c. odd

d. even

e. odd

f. even

14. Basic Number Facts Practice

25	56	36	24	27
49	18	64	35	81
32	21	40	72	28
0	63	20	12	48
7	16	36	42	72

Day 8: More About Factors

1. a. $10 \times 3 = 30$ $5 \times 6 = 30$

b. $8 \times 0 = 0$ $4 \times 0 = 0$

c. $12 \times 2 = 24$ $6 \times 4 = 24$

2. a. $(2 \times 3) \times 5 = 6 \times 5$ OR $2 \times (3 \times 5) = 2 \times 15$
 $= 30$ $= 30$

b. $(4 \times 2) \times 5 = 8 \times 5$ OR $4 \times (2 \times 5) = 4 \times 10$
 $= 40$ $= 40$

c. $(3 \times 4) \times 10 = 12 \times 10$ OR $3 \times (4 \times 10) = 3 \times 40$
 $= 120$ $= 120$

3. a. 18 b. 27 c. 63 d. 81 e. 45 f. 72

4. a. 36 b. 81 c. 45 d. 27 e. 54 f. 18 g. 72

5. a. 45 **b.** 27 **c.** 81 **d.** 36
e. 72 **f.** 54 **g.** 18 **h.** 9

Taking Another Look

6. a. 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

b. 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

Day 9: Using Multiplication to Solve Word Problems

1. $6 \times 7 = 42$

Kiko had 42 books.

2. $5 \times 8 = 40$

There are 40 cars in the parking lot.

3. $6 \times 8 = 48$

Stephan has 48 candies.

4. $(9 \times 4) + (9 \times 4)$

$$= 36 + 36$$

$$= 72$$

Altogether the bouquet has 72 leaves and petals.

5. $6 \times 6 = 36$

No, Jackson will not have enough pop.

6. $6 \times 9 = 54$

Pat has 54 CDs.

7. Many answers are possible. Three examples are provided.

- There are 8 teenagers invited to our family picnic. Each of them has been asked to bring 6 cans of pop to share at the picnic. How many cans of pop will be at the picnic?

Solution: $8 \times 6 = 48$

There will be 48 cans of pop at the picnic.

- Aunt Debbie made 8 plates of cupcakes for the picnic lunch. Each plate holds 6 cupcakes. How many cupcakes are at the picnic?

Solution: $8 \times 6 = 48$

There are 48 cupcakes at the picnic.

- At the family picnic, we played relay games. We had 8 teams. There were 6 children on each team. How many children were playing relays?

Solution: $8 \times 6 = 48$

There were 48 children playing relays.

8. a. Step 1: $8 \times 4 = 32$

b. Step 2: $7 \times 2 = 14$

c. Step 3: $32 + 14 = 46$

d. There were 46 legs altogether.

e. $(8 \times 4) + (7 \times 2)$
 $= 32 + 14$
 $= 46$

There were 46 legs altogether.

$$\begin{aligned}
 9. \quad & (2 \times 5) + (3 \times 3) + (1 \times 4) \\
 & = 10 + 9 + 4 \\
 & = 23
 \end{aligned}$$

It will cost \$23 to go to the movie.

$$\begin{aligned}
 10. \quad & (6 \times 4) + (8 \times 3) \\
 & = 24 + 24 \\
 & = 48
 \end{aligned}$$

Jack spent \$48.

$$\begin{array}{r}
 11. \text{ a. } 43 = 40 + 3 \\
 \quad \times 2 \\
 \hline
 = 80 + 6 \\
 = 86
 \end{array}$$

$$\begin{array}{r}
 \text{b. } 81 = 80 + 1 \\
 \quad \times 2 \\
 \hline
 = 160 + 2 \\
 = 162
 \end{array}$$

$$\begin{array}{r}
 12. \text{ a. } 68 = 60 + 8 \\
 \quad \times 2 \\
 \hline
 = 120 + 16 \\
 = 136
 \end{array}$$

$$\begin{array}{r}
 \text{b. } 52 = 50 + 2 \\
 \quad \times 2 \\
 \hline
 = 100 + 4 \\
 = 104
 \end{array}$$

$$\begin{array}{r}
 13. \text{ a. } 50 + 5 \\
 \quad \times 2 \\
 \hline
 = 100 + 10 \\
 = 110
 \end{array}$$

$$\begin{array}{r}
 \text{b. } 100 + 30 + 4 \\
 \quad \times 2 \\
 \hline
 = 200 + 60 + 8 \\
 = 268
 \end{array}$$

$$\begin{array}{r}
 \text{c. } 200 + 30 + 3 \\
 \quad \times 2 \\
 \hline
 = 400 + 60 + 6 \\
 = 466
 \end{array}$$

14. Multiplication Number Facts

72	56	32	54	40
42	45	48	49	63
36	40	81	0	24
64	9	28	54	18
25	16	63	48	21

Day 10: Putting It All Together (I)

All activities are to be done in Assignment Booklet 5A. This work will be marked by your teacher.

Day 11: Assessing What You Know (I)

All activities are to be done in Assignment Booklet 5A. This work will be marked by your teacher.

Day 12: Problem Solving

1.
 - a. Sandy picks peas.
 - b. She picks 7 more baskets of peas each day.
 - c. How many baskets of peas in all will she have picked by the end of Day 7?
2.
 - a. One way to solve this problem would be to look for a pattern. This is called the **Looking for a Pattern** strategy.
 - b. I could use a **T-table** to see the pattern.

3. Your completed T-table should look like this.

Days	Number of Baskets of Peas
1	12
2	$12 + 7$ or 19
3	$19 + 7$ or 26
4	$26 + 7$ or 33
5	$33 + 7$ or 40
6	$40 + 7$ or 47
7	$47 + 7$ or 54
Total: 231	

4.

ANSWER TO THE PROBLEM

Sandy picked 231 baskets of peas by the end of Day 7.

5. a. Tiger is collecting tabs from pop cans. Each day he collects twice as many as the day before. I need to find out on which day he will collect more than 500 tabs.

b. I can use the Looking for a Pattern strategy and a T-table.

c.

Days	Number of Tabs
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128
9	256
10	512

ANSWER TO THE PROBLEM

On Day 10 Tiger will collect more than 500 tabs.

- d. Ask: Did I answer the question? Yes
Did I calculate correctly? Yes
Is my answer reasonable? Yes

6. Multiplication Number Facts

27	40	42	30	32
64	42	54	20	56
54	81	24	25	18
49	63	48	72	28
72	48	30	45	36

Day13: Estimation and Multiplication

- a. 30 b. 90 c. 80 d. 130 e. 190
- a. 50
b. $50 \times 6 = 300$
c. Egbert would eat about **300** peanuts in 6 days.
- a. $5 \times 60 = 300$ b. $80 \times 7 = 560$
c. $3 \times 90 = 270$ d. $20 \times 9 = 180$
- a. $30 \times 8 = 240$
It can travel about 240 cm in 32 seconds.

b. $8 \times 90 = 720$
About 720 cars can park in the parking lot.

c. $30 \times 3 = 90$

The radio tower is about 90 m high.

5. a. $35 = 3 \text{ tens } 5 \text{ ones}$

b. $87 = 8 \text{ tens } 7 \text{ ones}$

c. $142 = 1 \text{ hundred } 4 \text{ tens } 2 \text{ ones}$

6. a. 46

b. 89

c. 638

7. a. 4 tens 1 one

b. 6 tens 7 ones

c. 5 hundreds 8 tens (58 tens is the same as $58 \times 10 = 580$.)

8. a. 1 group of ten




b. There are 6 ones left over.

c. 1 group of ten

d. There are 3 tens left over.

9. There is 1 hundred. The final answer is **136**.




Your final base ten block model should look similar to this.

Hundreds	Tens	Ones
		
1	3	6

You have 1 hundred, 3 tens, and 6 ones. So, $34 \times 4 = 136$.


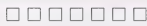

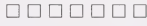

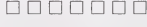

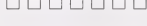

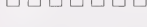

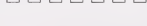

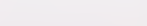


10. a. 3 groups of ten
 b. There are 6 ones left over.
 c. 2 groups of ten
 d. There are 7 tens left over.
 e. 2 hundreds
 f. The final answer is **276**.

The final model of your base ten blocks should look like this.

Hundreds	Tens	Ones
		
2	7	6

You now have 2 hundreds, 7 tens, and 6 ones. So, $46 \times 6 = 276$.

11.


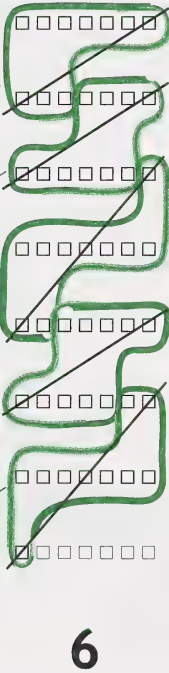
Hundreds	Tens	Ones
		
		
		
		
		
		
		
		

12. a. 56 ones

b. 5 tens

c. 6 ones

d.

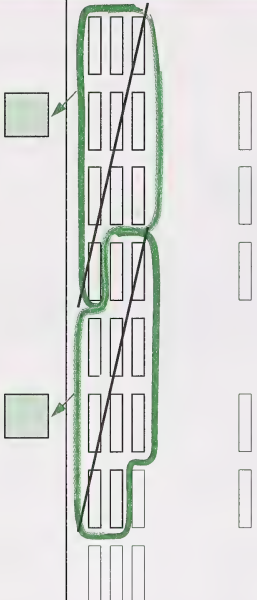


Hundreds	Tens	Ones
		

13. a. 29 tens

b. 2 tens

c. 9 tens

d.

Hundreds	Tens	Ones
		
	9	6

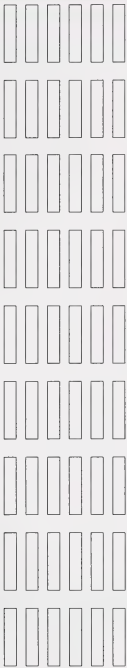



14. a.

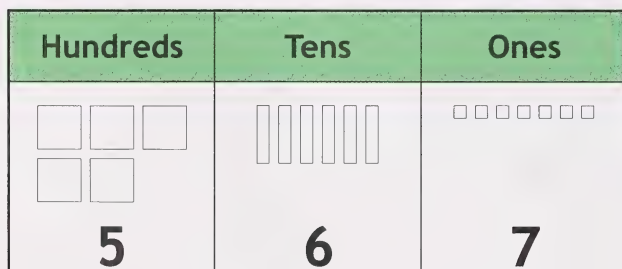
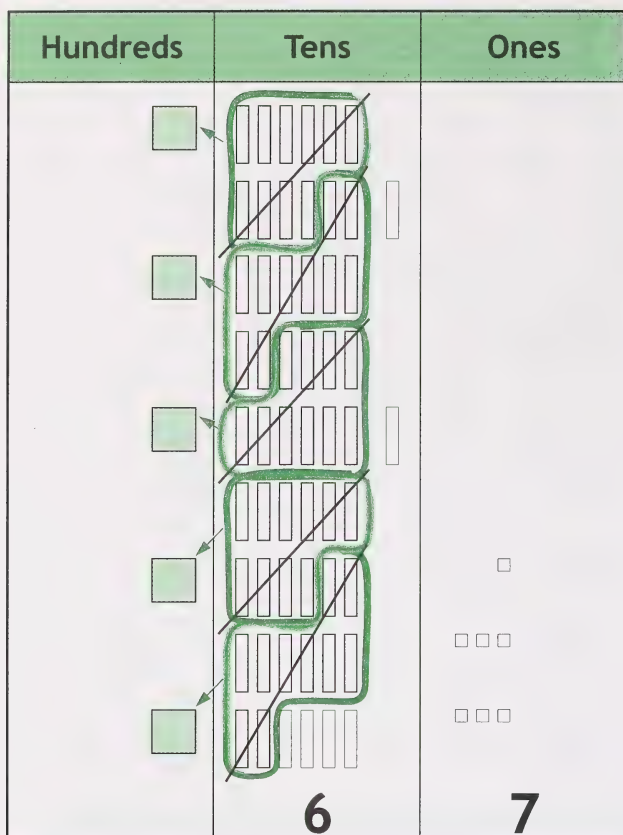
Hundreds	Tens	Ones
		
2	9	6

b. 2 hundreds 9 tens 6 ones

c. $37 \times 8 = 296$

15.

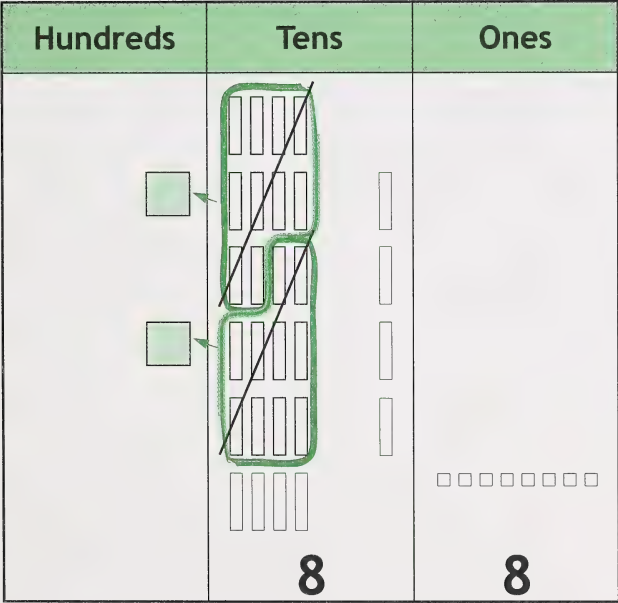
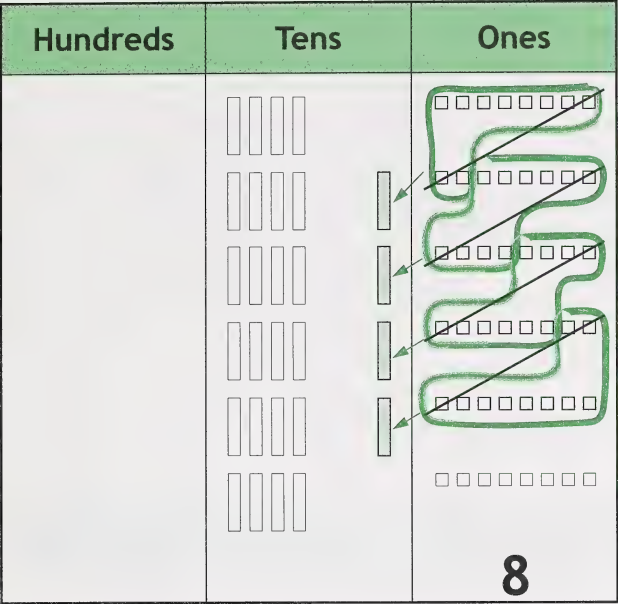
Hundreds	Tens	Ones
		   7






5 hundreds 6 tens 7 ones

$$63 \times 9 = 567$$

16.




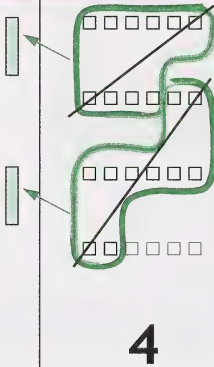
Hundreds	Tens	Ones
 2	 8	 8

2 hundreds 8 tens 8 ones


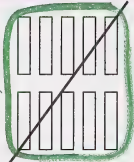


$$48 \times 6 = 288$$




Taking Another Look

17.

Hundreds	Tens	Ones
		 4

18.

Hundreds	Tens	Ones
	 	
	5	9

Hundreds	Tens	Ones
		
1	5	9

$$53 \times 3 = 159$$

Day 14: Multiplying Two-Digit Numbers by One-Digit Numbers

1. a. $55 = 50 + 5$
- b. $63 = 60 + 3$
- c. $81 = 80 + 1$
- d. $15 = 10 + 5$
- e. $39 = 30 + 9$

$$\begin{array}{ll}
 \text{2. } 84 \times 6 = (80 + 4) \times 6 & \text{or } 84 = 80 + 4 \\
 = (80 \times 6) + (4 \times 6) & \begin{array}{r} \times 6 \\ \times 6 \end{array} \\
 = 480 + 24 & = (80 \times 6) + (4 \times 6) \\
 = 504 & = 480 + 24 \\
 & = 504
 \end{array}$$

$$\begin{array}{ll}
 \text{3. a. } 65 \times 9 = (60 + 5) \times 9 & \text{or } 65 = 60 + 5 \\
 = (60 \times 9) + (5 \times 9) & \begin{array}{r} \times 9 \\ \times 9 \end{array} \\
 = 540 + 45 & = (60 \times 9) + (5 \times 9) \\
 = 585 & = 540 + 45 \\
 & = 585
 \end{array}$$

$$\begin{array}{ll}
 \text{b. } 74 = 70 + 4 & \text{or } 74 \times 8 = (70 + 4) \times 8 \\
 \begin{array}{r} \times 8 \\ \times 8 \end{array} & = (70 \times 8) + (4 \times 8) \\
 = (70 \times 8) + (4 \times 8) & = 560 + 32 \\
 = 560 + 32 & = 592 \\
 = 592 &
 \end{array}$$

$$\begin{array}{ll}
 \text{4. a. } 72 \times 8 = (70 + 2) \times 8 & \text{b. } 29 = 20 + 9 \\
 = (70 \times 8) + (2 \times 8) & \begin{array}{r} \times 7 \\ \times 7 \end{array} \\
 = 560 + 16 & = (20 \times 7) + (9 \times 7) \\
 = 576 & = 140 + 63 \\
 & = 203
 \end{array}$$

$$\begin{aligned}
 \text{c. } 61 \times 7 &= (60 + 1) \times 7 \\
 &= (60 \times 7) + (1 \times 7) \\
 &= 420 + 7 \\
 &= 427
 \end{aligned}$$

$$\begin{aligned}
 \text{d. } 83 &= 80 + 3 \\
 \begin{array}{r} \times 4 \\ \hline \end{array} & \quad \begin{array}{r} \times 4 \\ \hline \end{array} \\
 &= (80 \times 4) + (3 \times 4) \\
 &= 320 + 12 \\
 &= 332
 \end{aligned}$$

5.

H	T	O
	7	3
		$\times 6$
	1	8
4	2	0
4	3	8

$$\begin{array}{r}
 73 \\
 \times 6 \\
 \hline
 18 \\
 420 \\
 \hline
 438
 \end{array}$$

6.

H	T	O
	4	6
		$\times 5$
	3	0
2	0	0
2	3	0

$$\begin{array}{r}
 46 \\
 \times 5 \\
 \hline
 30 \\
 200 \\
 \hline
 230
 \end{array}$$

7. a.

$$\begin{array}{r}
 97 \\
 \times 7 \\
 \hline
 49 \\
 630 \\
 \hline
 679
 \end{array}$$

b.

$$\begin{array}{r}
 42 \\
 \times 6 \\
 \hline
 12 \\
 240 \\
 \hline
 252
 \end{array}$$

c.

$$\begin{array}{r}
 87 \\
 \times 9 \\
 \hline
 63 \\
 720 \\
 \hline
 783
 \end{array}$$

d.

$$\begin{array}{r}
 74 \\
 \times 5 \\
 \hline
 20 \\
 350 \\
 \hline
 370
 \end{array}$$

e.

$$\begin{array}{r}
 69 \\
 \times 8 \\
 \hline
 72 \\
 480 \\
 \hline
 552
 \end{array}$$

f.

$$\begin{array}{r}
 38 \\
 \times 4 \\
 \hline
 32 \\
 120 \\
 \hline
 152
 \end{array}$$

8. a. Largest product: $52 \times 6 = 312$

b. Smallest product: $26 \times 5 = 130$

9. a. $86 \times 7 =$

$68 \times 7 =$

$76 \times 8 =$

$67 \times 8 =$

Largest product: $76 \times 8 = 608$

b. Smallest product: $68 \times 7 = 476$

Taking Another Look

10. No answers are provided.

11. a. $56 \times 9 = (50 + 6) \times 9$

$= (50 \times 9) + (6 \times 9)$

$= 450 + 54$

$= 504$

b. $83 = 80 + 3$

$\begin{array}{r} \times 6 \\ \hline \end{array}$ $\begin{array}{r} \times 6 \\ \hline \end{array}$

$= (80 \times 6) + (3 \times 6)$

$= 480 + 18$

$= 498$

c. $44 \times 8 = (40 + 4) \times 8$

$= (40 \times 8) + (4 \times 8)$

$= 320 + 32$

$= 352$

d. $39 = 30 + 9$

$\begin{array}{r} \times 7 \\ \hline \end{array}$ $\begin{array}{r} \times 7 \\ \hline \end{array}$

$= (30 \times 7) + (9 \times 7)$

$= 210 + 63$

$= 273$

12. a.
$$\begin{array}{r} 56 \\ \times 7 \\ \hline 42 \\ 350 \\ \hline 392 \end{array}$$

b.
$$\begin{array}{r} 87 \\ \times 6 \\ \hline 42 \\ 480 \\ \hline 522 \end{array}$$

c.
$$\begin{array}{r} 94 \\ \times 5 \\ \hline 20 \\ 450 \\ \hline 470 \end{array}$$

d.
$$\begin{array}{r} 85 \\ \times 9 \\ \hline 45 \\ 720 \\ \hline 765 \end{array}$$

13. Multiplication Number Facts

64	36	54	56	49
42	36	40	25	63
45	36	28	45	48
32	21	30	18	72
54	56	81	35	63

Day 15: The Short Form for Multiplication

1.

H	T	O
	² 4	5
		$\times 5$
2	2	5

$$\begin{array}{r} 2 \\ 45 \\ \times 5 \\ \hline 225 \end{array}$$

2. a.
$$\begin{array}{r} 83 \\ \times 8 \\ \hline 664 \end{array}$$

H	T	O
	² 8	3
		$\times 8$
6	6	4

b.
$$\begin{array}{r} 47 \\ \times 7 \\ \hline 329 \end{array}$$

H	T	O
	⁴ 4	7
		$\times 7$
3	2	9

c.
$$\begin{array}{r} 96 \\ \times 4 \\ \hline 384 \end{array}$$

H	T	O
	² 9	6
		$\times 4$
3	8	4

d.
$$\begin{array}{r} 38 \\ \times 7 \\ \hline 266 \end{array}$$

H	T	O
	⁵ 3	8
		$\times 7$
2	6	6

$$\begin{array}{r} \text{3. a. } 57 \\ \times 6 \\ \hline 342 \end{array}$$

$$\begin{array}{r} \text{b. } 37 \\ \times 4 \\ \hline 148 \end{array}$$

$$\begin{array}{r} \text{c. } 27 \\ \times 3 \\ \hline 81 \end{array}$$

$$\begin{array}{r} \text{d. } 98 \\ \times 5 \\ \hline 490 \end{array}$$

$$\begin{array}{r} \text{e. } 45 \\ \times 7 \\ \hline 315 \end{array}$$

$$\begin{array}{r} \text{f. } 69 \\ \times 8 \\ \hline 552 \end{array}$$

4. a. 200
c. 400

- b. 700
d. 900

5. a. $200 \times 7 = 1400$
c. $700 \times 8 = 5600$

- b. $600 \times 3 = 1800$
d. $900 \times 7 = 6300$

6. a. $600 \times 20 = 12\ 000$
c. $500 \times 40 = 20\ 000$

- b. $400 \times 50 = 20\ 000$
d. $900 \times 80 = 72\ 000$

7. a. $462 \times 20 = 500 \times 20$
 $= 10\ 000$

There are about 10 000 CDs.

- b. $176 \times 7 = 200 \times 7$
 $= 1400$

Maria has about 1400 stamps.

- c. $435 \times 5 = 400 \times 5$
 $= 2000$

Jordi has about \$2000.

$$8. \text{ a. } 23 \times 8 = 20 \times 8 + 3 \times 8$$

$$= 160 + 24$$

$$= 184$$

There are 184 cartons altogether.

$$\text{b. } 28 \times 6 = 30 \times 6 - 2 \times 6$$

$$= 180 - 12$$

$$= 168$$

There are 168 people waiting.

$$\text{c. } 6 \times 62 = 6 \times 60 + 6 \times 2$$

$$= 360 + 12$$

$$= 372$$

Seth has 372 marbles.

Taking Another Look

$$9. \text{ a. } \begin{array}{r} 2 \\ 43 \\ \times 7 \\ \hline 301 \end{array}$$

$$\text{b. } \begin{array}{r} 2 \\ 98 \\ \times 3 \\ \hline 294 \end{array}$$

$$\text{c. } \begin{array}{r} 3 \\ 54 \\ \times 8 \\ \hline 432 \end{array}$$

$$\text{d. } \begin{array}{r} 4 \\ 88 \\ \times 5 \\ \hline 440 \end{array}$$

$$\text{e. } \begin{array}{r} 2 \\ 65 \\ \times 4 \\ \hline 260 \end{array}$$

$$\text{f. } \begin{array}{r} 3 \\ 67 \\ \times 5 \\ \hline 335 \end{array}$$

$$\text{g. } \begin{array}{r} 3 \\ 49 \\ \times 4 \\ \hline 196 \end{array}$$

$$\text{h. } \begin{array}{r} 5 \\ 28 \\ \times 7 \\ \hline 196 \end{array}$$

$$\text{i. } \begin{array}{r} 6 \\ 97 \\ \times 9 \\ \hline 873 \end{array}$$

$$\text{j. } \begin{array}{r} 1 \\ 56 \\ \times 3 \\ \hline 168 \end{array}$$

$$\text{k. } \begin{array}{r} 3 \\ 45 \\ \times 6 \\ \hline 270 \end{array}$$

$$\text{l. } \begin{array}{r} 34 \\ \times 2 \\ \hline 68 \end{array}$$

$$\text{m. } \begin{array}{r} 1 \\ 92 \\ \times 8 \\ \hline 736 \end{array}$$

$$\text{n. } \begin{array}{r} 5 \\ 76 \\ \times 9 \\ \hline 684 \end{array}$$

$$\text{o. } \begin{array}{r} 2 \\ 44 \\ \times 5 \\ \hline 220 \end{array}$$

10. Multiplication Number Facts

40	36	36	42	56
72	49	24	30	64
48	63	35	32	54
72	81	54	42	56
25	45	48	63	28

Day 16: Multiplying Three-Digit Numbers by One-Digit Numbers

1. 10 hundreds
2.
 - a. 4 thousands 1 hundred 6 tens 0 ones
 - b. 8 thousands 9 hundreds 4 tens 6 ones
 - c. 9 thousands 9 hundreds 9 tens 0 ones
3.
 - a. 2 thousands 4 hundreds
 - b. 4 thousands 7 hundreds
 - c. 6 thousands 3 hundreds
4.
 - a. 1 group of ten
 - b. 8 ones left over
5.
 - a. 1 group of ten
 - b. 3 tens left over
6.
 - a. 1 group of ten
 - b. 6 hundreds left over

7. a.

Thousands	Hundreds	Tens	Ones
	<div>□ □ □ □ □ □ □</div>	<div>□ □ □ □ □</div>	<div>□ □ □ □</div>
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	<div>□ □ □ □ □ □ □</div>	<div>□ □ □ □ □</div>	<div>□ □ □ □</div>

- b. 24 ones Make 2 groups of ten.
 c. 2 tens will move
 d. There will be 4 ones in the product.

Thousands	Hundreds	Tens	Ones
	<div>□ □ □ □ □ □ □</div>	<div>□ □ □ □ □</div>	<div>□ □ □ □</div>
	<div>□ □ □ □ □ □ □</div>	<div>□ □ □ □ □</div>	<div>□ □ □ □</div>
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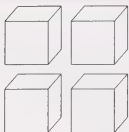



8. a. 32 tens b. 3 hundreds c. 2 tens

Thousands	Hundreds	Tens	Ones
		2	4

9. a. 45 hundreds Make 4 groups of ten.
 b. 4 thousands
 c. 5 hundreds

Thousands	Hundreds	Tens	Ones
	5	2	4





d.

Thousands	Hundreds	Tens	Ones
 4	 5	 2	 4

e. 4 thousands 5 hundreds 2 tens 4 ones

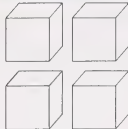
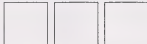


f. $754 \times 6 = 4524$

10. a.

Thousands	Hundreds	Tens	Ones
		 	 6

Thousands	Hundreds	Tens	Ones
	<div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div>	<div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> </div>	<div>□ □</div> <div>□ □</div> <div>□ □</div>
		3	6

Thousands	Hundreds	Tens	Ones
<div> <div>□</div> <div>□</div> <div>□</div> <div>□</div> </div>	<div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> <div> <div>□ □ □ □ □</div> <div>□ □ □ □ □</div> </div> </div>	<div>□</div> <div>□</div> <div>□</div>	<div>□ □</div> <div>□ □</div> <div>□ □</div>
	3	3	6

Thousands	Hundreds	Tens	Ones
 4	 3	 3	 6

b. $542 \times 8 = 4336$

Day 17: More About Multiplying Large Numbers

1. a. $756 = 700 + 50 + 6$
b. $325 = 300 + 20 + 5$
c. $849 = 800 + 40 + 9$

2. $286 = 200 + 80 + 6$

$$\begin{array}{r} \times 6 \\ \hline \end{array} \quad \begin{array}{r} \times 6 \\ \hline \end{array}$$

$$= (200 \times 6) + (80 \times 6) + (6 \times 6)$$

$$= 1200 + 480 + 36$$

$$= 1716$$

3. a. $621 = 600 + 20 + 1$

$$\begin{array}{r} \times 4 \quad \times 4 \\ \hline = (600 \times 4) + (20 \times 4) + (1 \times 4) \\ = 2400 + 80 + 4 \\ = 2484 \end{array}$$

b. $763 = 700 + 60 + 3$

$$\begin{array}{r} \times 7 \quad \times 7 \\ \hline = (700 \times 7) + (60 \times 7) + (3 \times 7) \\ = 4900 + 420 + 21 \\ = 5341 \end{array}$$

c. $481 = 400 + 80 + 1$

$$\begin{array}{r} \times 5 \quad \times 5 \\ \hline = (400 \times 5) + (80 \times 5) + (1 \times 5) \\ = 2000 + 400 + 5 \\ = 2405 \end{array}$$

d. $372 = 300 + 70 + 2$

$$\begin{array}{r} \times 8 \quad \times 8 \\ \hline = (300 \times 8) + (70 \times 8) + (2 \times 8) \\ = 2400 + 560 + 16 \\ = 2976 \end{array}$$

4.

TH	H	T	O
	5	4	2
			$\times 8$
		1	6
	3	2	0
4	0	0	0
4	3	3	6

$$\begin{array}{r} 542 \\ \times 8 \\ \hline 16 \\ 320 \\ 4000 \\ \hline 4336 \end{array}$$

5.

TH	H	T	O
	8	1	4
			$\times 3$
		1	2
		3	0
2	4	0	0
2	4	4	2

$$\begin{array}{r} 814 \\ \times 3 \\ \hline 12 \\ 30 \\ 2400 \\ \hline 2442 \end{array}$$

6. a.
$$\begin{array}{r} 749 \\ \times 7 \\ \hline 63 \\ 280 \\ 4900 \\ \hline 5243 \end{array}$$

(7×9)
 (7×40)
 (7×700)

b.
$$\begin{array}{r} 368 \\ \times 9 \\ \hline 72 \\ 540 \\ 2700 \\ \hline 3312 \end{array}$$

(9×8)
 (9×60)
 (9×300)

c.
$$\begin{array}{r} 294 \\ \times 4 \\ \hline 16 \\ 360 \\ 800 \\ \hline 1176 \end{array}$$

(4×4)
 (4×90)
 (4×200)

d.
$$\begin{array}{r} 453 \\ \times 7 \\ \hline 21 \\ 350 \\ 2800 \\ \hline 3171 \end{array}$$

(7×3)
 (7×50)
 (7×400)

7. a. $7 \times 436 = 7 \times 400$
 $= 2800$

$$\begin{array}{r} 436 \\ \times 7 \\ \hline 42 \\ 210 \\ 2800 \\ \hline 3052 \end{array}$$

b. $8 \times 392 = 8 \times 400$
 $= 3200$

$$\begin{array}{r} 392 \\ \times 8 \\ \hline 16 \\ 720 \\ 2400 \\ \hline 3136 \end{array}$$

Day 18: Using the Short Form to Multiply Large Numbers

1.

TH	H	T	O
	5 8	4 7	6 × 7
6	1	3	2

2.

TH	H	T	O
	8 5	6 9	7 × 9
5	3	7	3

$$\begin{array}{r} \text{3. a. } \begin{array}{r} \overset{51}{392} \\ \times 6 \\ \hline 2352 \end{array} \quad 400 \times 6 = 2400 \end{array}$$

$$\begin{array}{r} \text{b. } \begin{array}{r} \overset{25}{837} \\ \times 8 \\ \hline 6696 \end{array} \quad 800 \times 8 = 6400 \end{array}$$

$$\begin{array}{r} \text{c. } \begin{array}{r} \overset{33}{456} \\ \times 6 \\ \hline 2736 \end{array} \quad 500 \times 6 = 3000 \end{array}$$

$$\begin{array}{r} \text{d. } \begin{array}{r} \overset{26}{239} \\ \times 7 \\ \hline 1673 \end{array} \quad 200 \times 7 = 1400 \end{array}$$

$$\begin{array}{r} \text{4. a. } \begin{array}{r} \overset{54}{365} \\ \times 8 \\ \hline 2920 \end{array} \end{array}$$

$$\begin{array}{r} \text{b. } \begin{array}{r} \overset{66}{167} \\ \times 9 \\ \hline 1503 \end{array} \end{array}$$

$$\begin{array}{r} \text{c. } \begin{array}{r} \overset{21}{684} \\ \times 3 \\ \hline 2052 \end{array} \end{array}$$

$$\begin{array}{r} \text{d. } \begin{array}{r} \overset{45}{258} \\ \times 7 \\ \hline 1806 \end{array} \end{array}$$

5. a. Estimate

Actual

$$\begin{array}{r} 300 \times 8 = 2400 \end{array} \quad \begin{array}{r} \overset{24}{325} \\ \times 8 \\ \hline 2600 \end{array}$$

There are 2600 telephones in the office building.

b. Estimate

Actual

$$\begin{array}{r} 500 \times 8 = 4000 \end{array} \quad \begin{array}{r} \overset{54}{465} \\ \times 8 \\ \hline 3720 \end{array}$$

It can fly 3720 km in 8 days.

c. Estimate

$$300 \times 6 = 1800$$

Actual

$$\begin{array}{r} 11 \\ 322 \\ \times 6 \\ \hline 1932 \end{array}$$

Six aquariums will hold 1932 L of water.

d. Estimate

$$500 \times 4 = 2000$$

Actual

$$\begin{array}{r} 32 \\ 475 \\ \times 4 \\ \hline 1900 \end{array}$$

There are 1900 pieces altogether.

6. a. • The easy pair is 2×5 .

• $(2 \times 5) \times 7$

• $10 \times 7 = 70$

b. • The easy pair is 2×15 .

• $(2 \times 15) \times 9$

• $30 \times 9 = 270$

$$\begin{aligned} 7. (4 \times 50) \times 8 &= 200 \times 8 \\ &= 1600 \end{aligned}$$

$$\begin{aligned} 8. (25 \times 4) \times (5 \times 5) &= 100 \times 25 \\ &= 2500 \end{aligned}$$

$$\begin{aligned} 9. (15 \times 2) \times (15 \times 2) \times 3 &= 30 \times 30 \times 3 \\ &= 900 \times 3 \\ &= 2700 \end{aligned}$$

10. Addition Number Facts

20	54	64	56	16
81	35	32	40	36
56	63	42	45	72
63	48	30	48	49
40	36	35	24	28

Taking Another Look

$$\begin{array}{r} 1 \\ 1. \quad 321 \\ \times \quad 6 \\ \hline 1926 \end{array}$$

$$\begin{array}{r} 43 \\ 2. \text{ a. } 765 \\ \times \quad 7 \\ \hline 5355 \end{array}$$

$$\begin{array}{r} 76 \\ \text{b. } 987 \\ \times \quad 9 \\ \hline 8883 \end{array}$$

$$\begin{array}{r} 32 \\ \text{c. } 364 \\ \times \quad 6 \\ \hline 2184 \end{array}$$

$$\begin{array}{r} 1 \\ \text{d. } 702 \\ \times \quad 8 \\ \hline 5616 \end{array}$$

$$\begin{array}{r} 1 \\ \text{e. } 403 \\ \times \quad 5 \\ \hline 2015 \end{array}$$

$$\begin{array}{r} 2 \\ \text{f. } 760 \\ \times \quad 4 \\ \hline 3040 \end{array}$$

$$\begin{array}{r} 47 \\ \text{g. } 359 \\ \times \quad 8 \\ \hline 2872 \end{array}$$

$$\begin{array}{r} 2 \\ \text{h. } 208 \\ \times \quad 3 \\ \hline 624 \end{array}$$

$$\begin{array}{r} 32 \\ \text{i. } 587 \\ \times \quad 4 \\ \hline 2348 \end{array}$$

$$\begin{array}{r} 1 \\ \text{j. } 405 \\ \times \quad 3 \\ \hline 1215 \end{array}$$

$$\begin{array}{r} 24 \\ \text{k. } 648 \\ \times \quad 5 \\ \hline 3240 \end{array}$$

$$\begin{array}{r} 6 \\ \text{l. } 780 \\ \times \quad 8 \\ \hline 6240 \end{array}$$

$$\begin{array}{r} 43 \\ \text{m. } 754 \\ \times \quad 9 \\ \hline 6786 \end{array}$$

$$\begin{array}{r} 65 \\ \text{n. } 998 \\ \times \quad 7 \\ \hline 6986 \end{array}$$

$$\begin{array}{r} 52 \\ \text{o. } 384 \\ \times \quad 6 \\ \hline 2304 \end{array}$$

$$\begin{array}{r} 1 \\ \text{p. } 803 \\ \times \quad 5 \\ \hline 4015 \end{array}$$

$$\begin{array}{r} \text{q.} \quad \begin{array}{r} 13 \\ 315 \\ \times 7 \\ \hline 2205 \end{array} \end{array}$$

$$\begin{array}{r} \text{r.} \quad \begin{array}{r} 31 \\ 842 \\ \times 9 \\ \hline 7578 \end{array} \end{array}$$

$$\begin{array}{r} \text{s.} \quad \begin{array}{r} 33 \\ 666 \\ \times 6 \\ \hline 3996 \end{array} \end{array}$$

$$\begin{array}{r} \text{t.} \quad \begin{array}{r} 211 \\ \times 3 \\ \hline 633 \end{array} \end{array}$$

Day 19: Putting It All Together (II)

All activities are to be done in Assignment Booklet 5B. This work will be marked by your teacher.

Day 20: Assessing What You Know(II)

All activities are to be done in Assignment Booklet 5B. This work will be marked by your teacher.

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Journal Writing: PhotoDisc, Inc.

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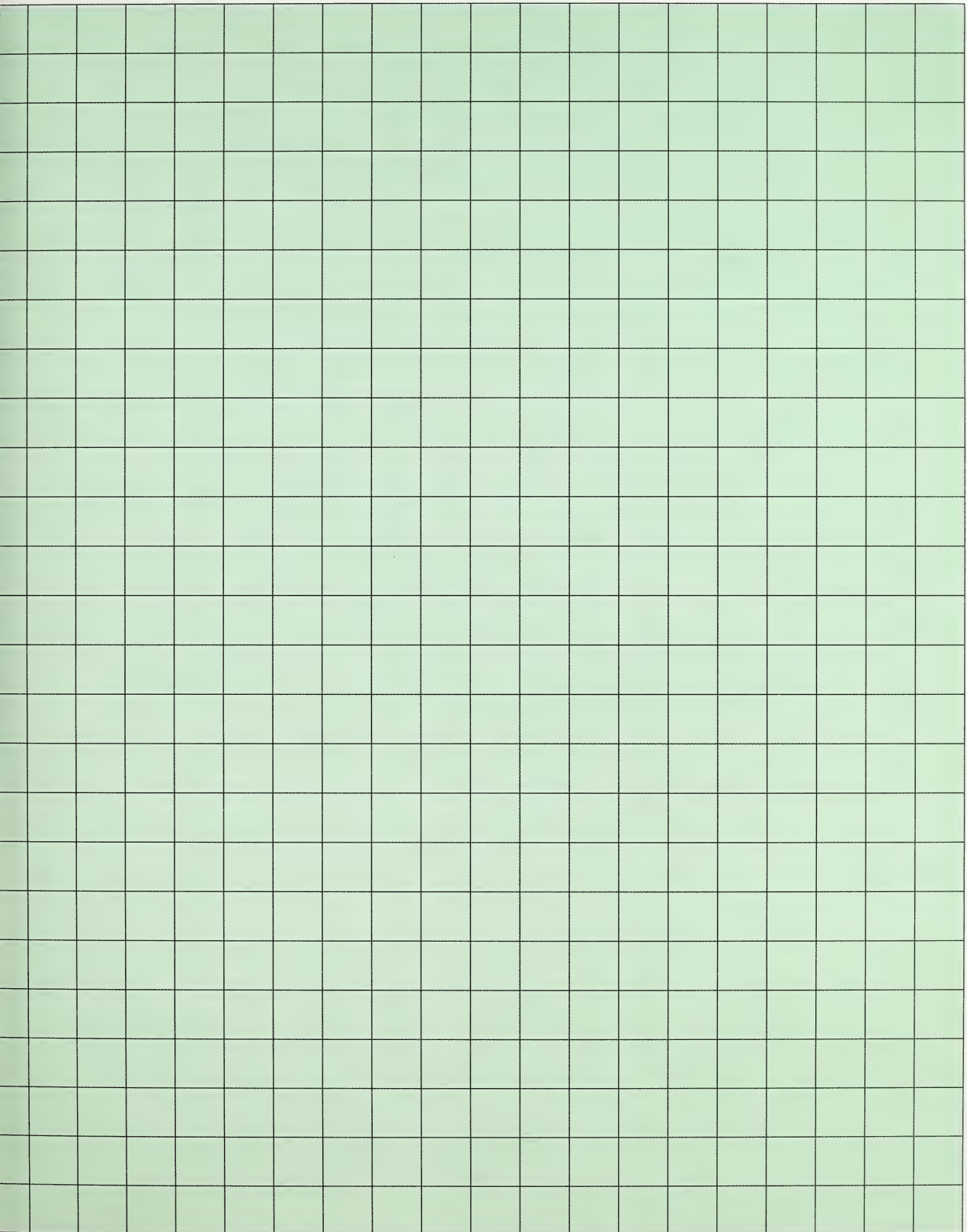
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Cut-Out Learning Aids

Day 1: Multiplication Facts Chart

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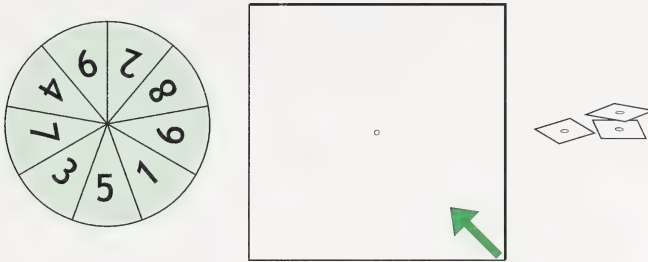
Day 4: Tiles



Day 4: Spin a Fact Game

Directions for Assembling the Spinner

1. Cut out the circle, the large square, and the three small squares.



2. Find a paper clip and bend up just the outside end. This part should point straight up when the paper clip is lying flat on your desktop.

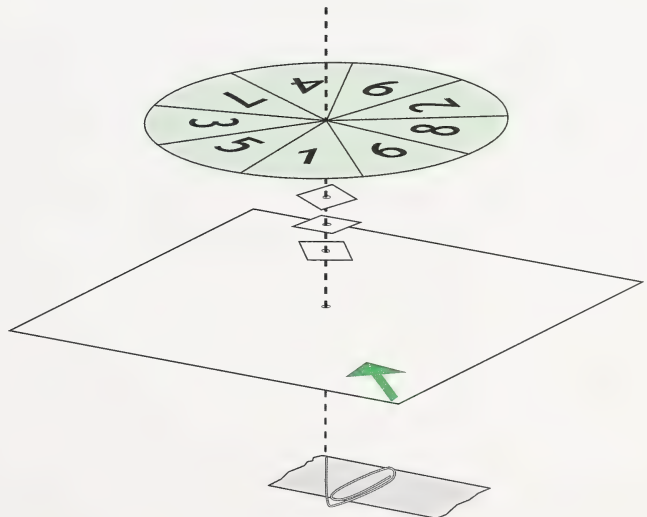


3. Poke a hole in the centre of the circle with a pin or a small nail. (Be exact!) Do the same to the large square (the base) and to the three small squares (the washers).

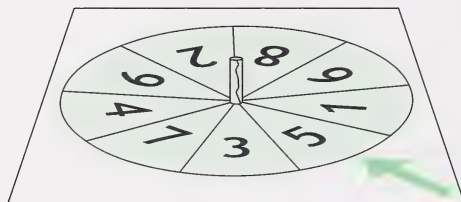
4. Cut two pieces of masking tape. Each should be about 3 cm long.

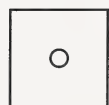
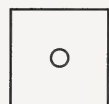
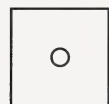
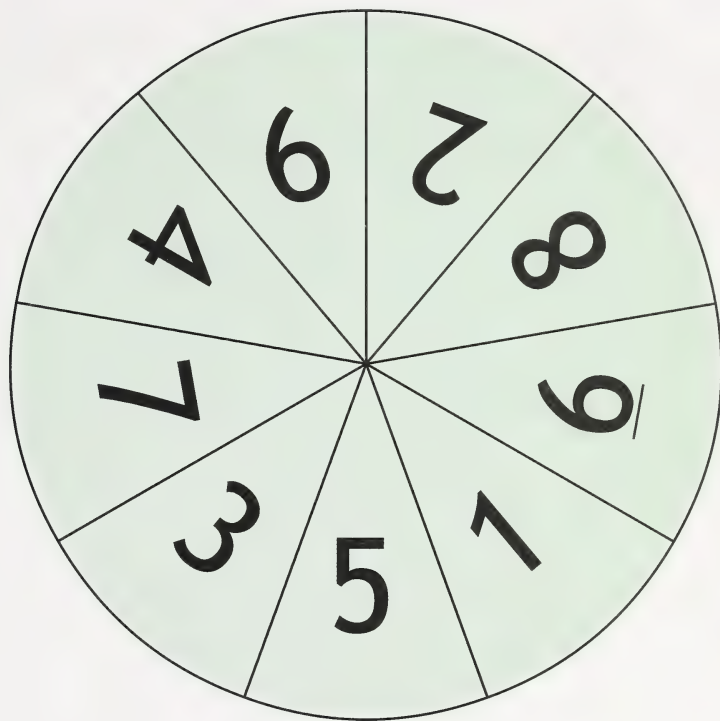
5. To assemble the spinner, first poke the paper clip through the base and tape it underneath to hold it in place.

6. Put the three cardboard washers on the part of the paper clip that is pointing up.

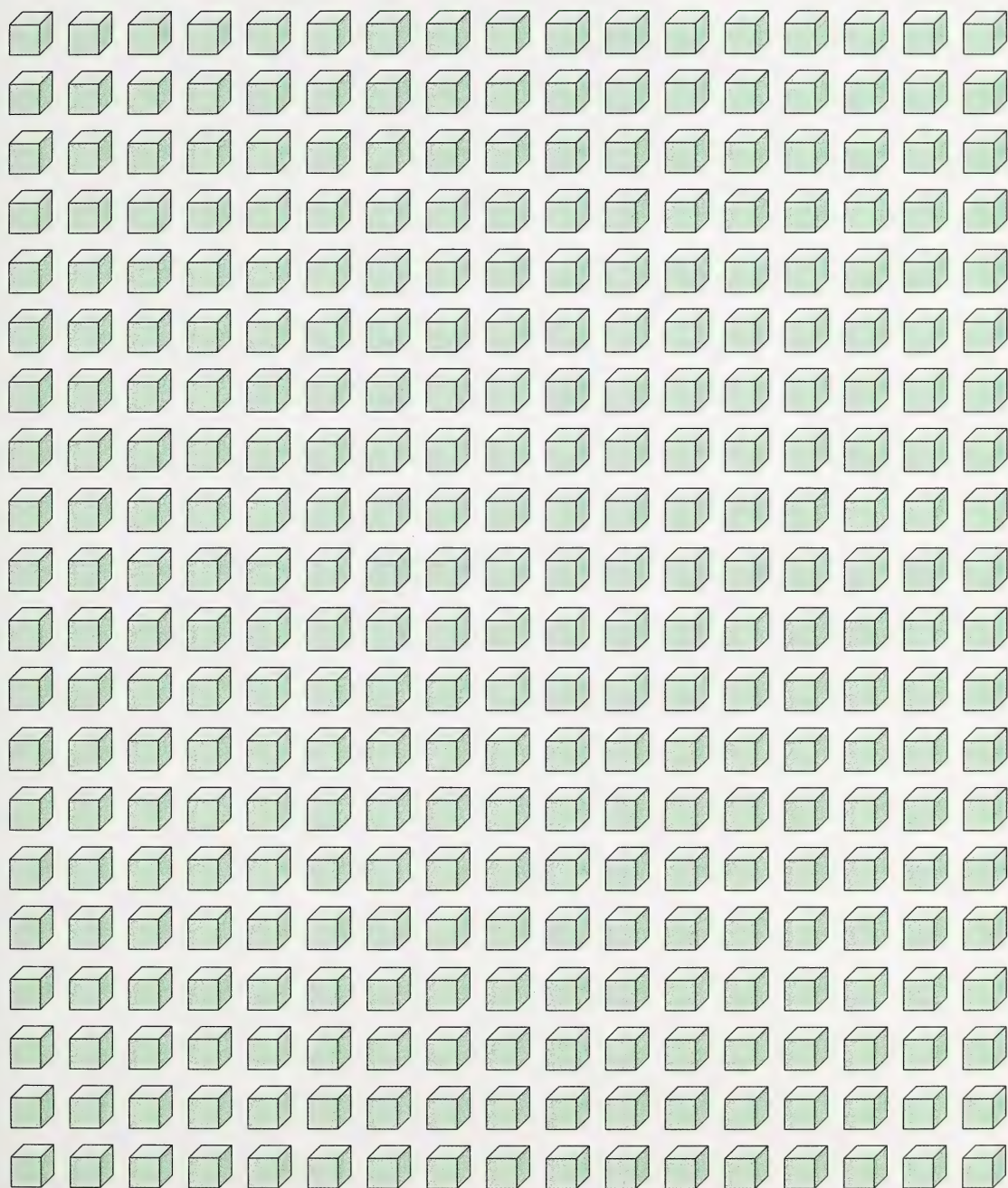


7. Next put on the circle. Wrap a piece of tape around the point of the paper clip.
8. Use your index finger to spin the spinner. The large arrow on the base shows you what to read.

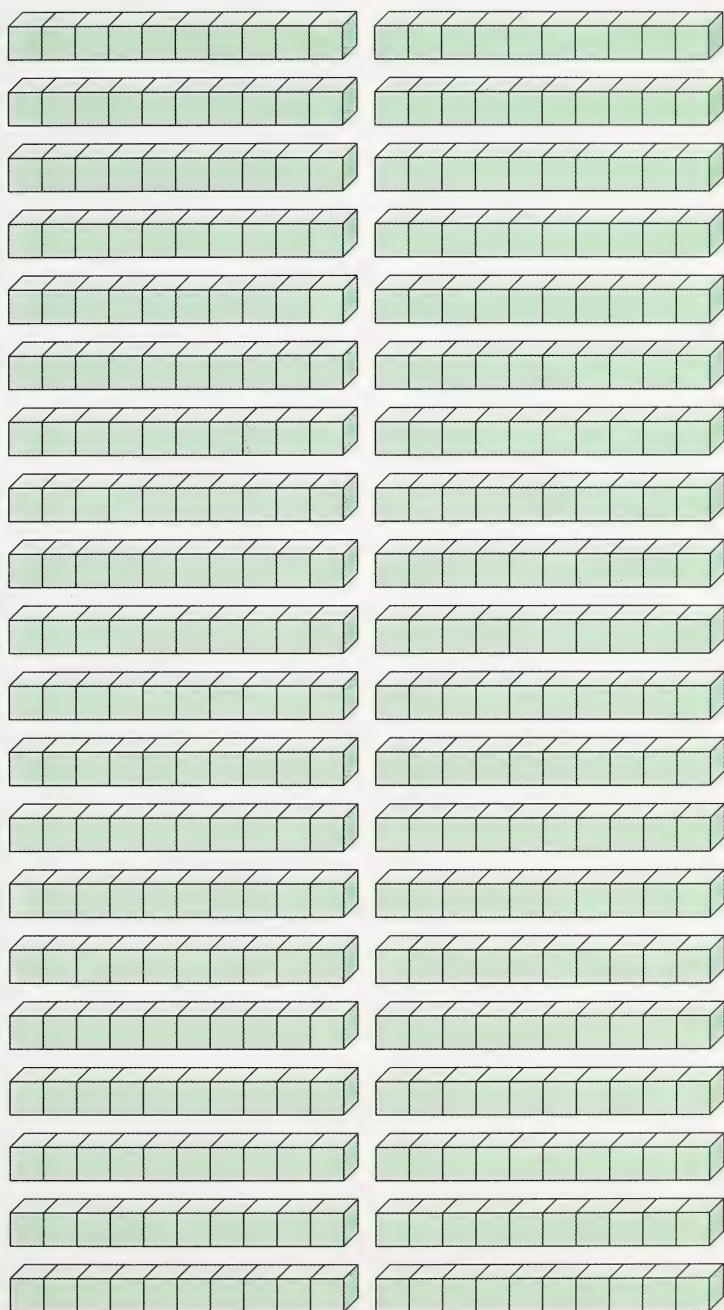
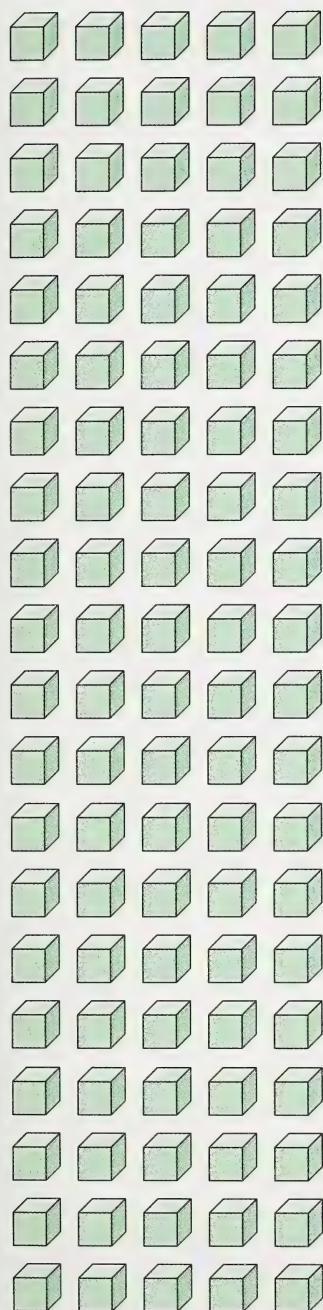




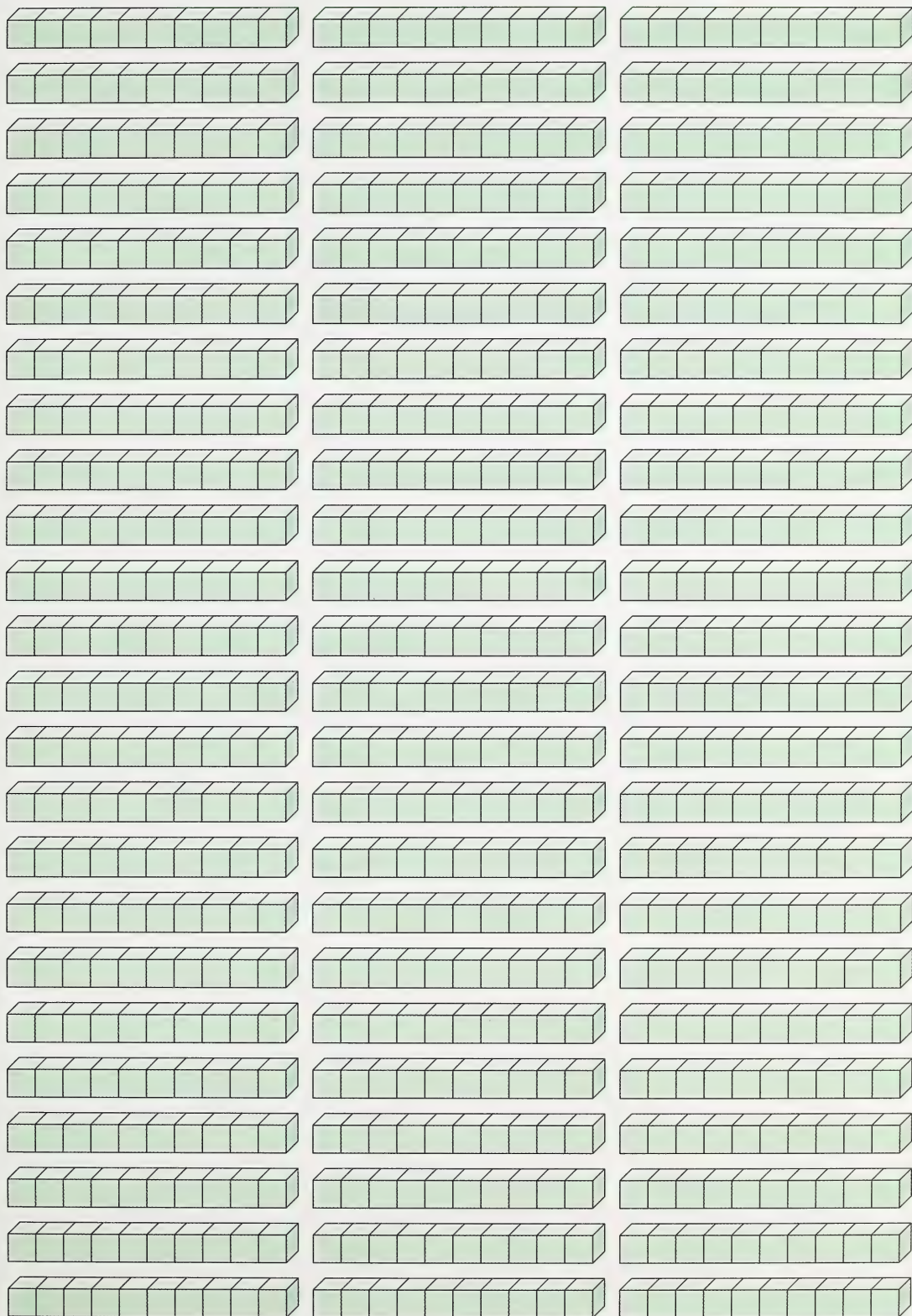
Day 5: Ones Cubes



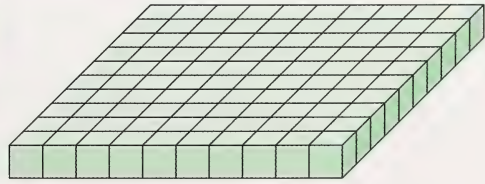
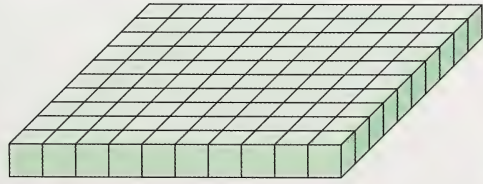
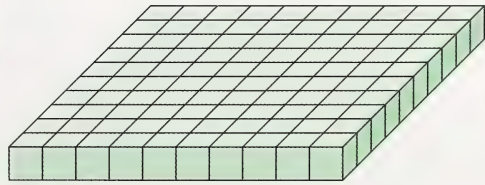
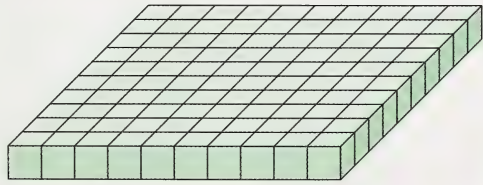
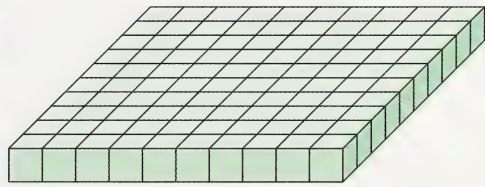
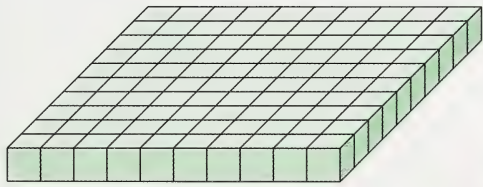
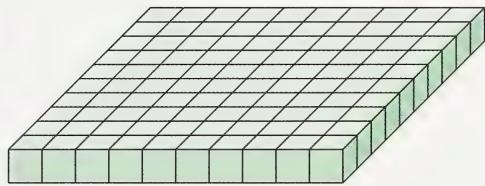
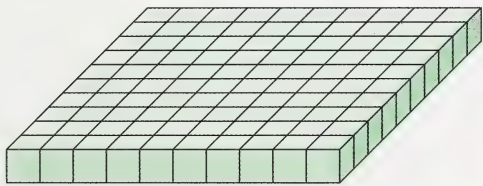
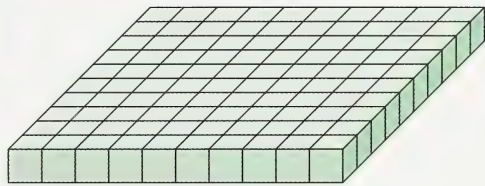
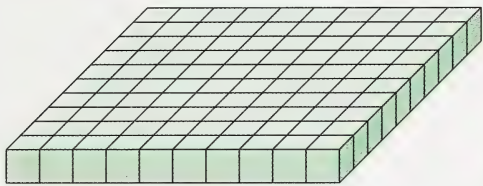
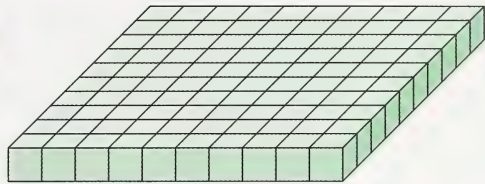
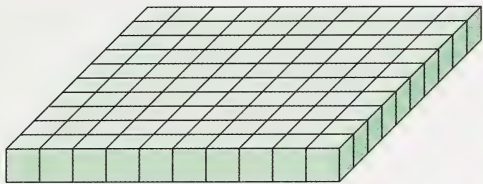
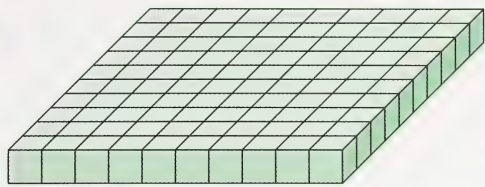
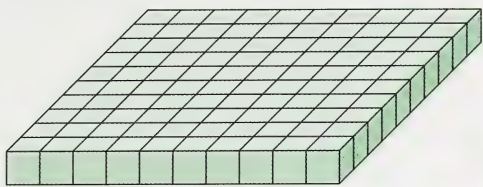
Day 13: Base Ten Blocks



Day 13: Base Ten Blocks (continued)



Day 13: Base Ten Blocks (continued)



Hundreds (100)

Tens

↑ (Glue or tape second page here) ↑

BASE 10

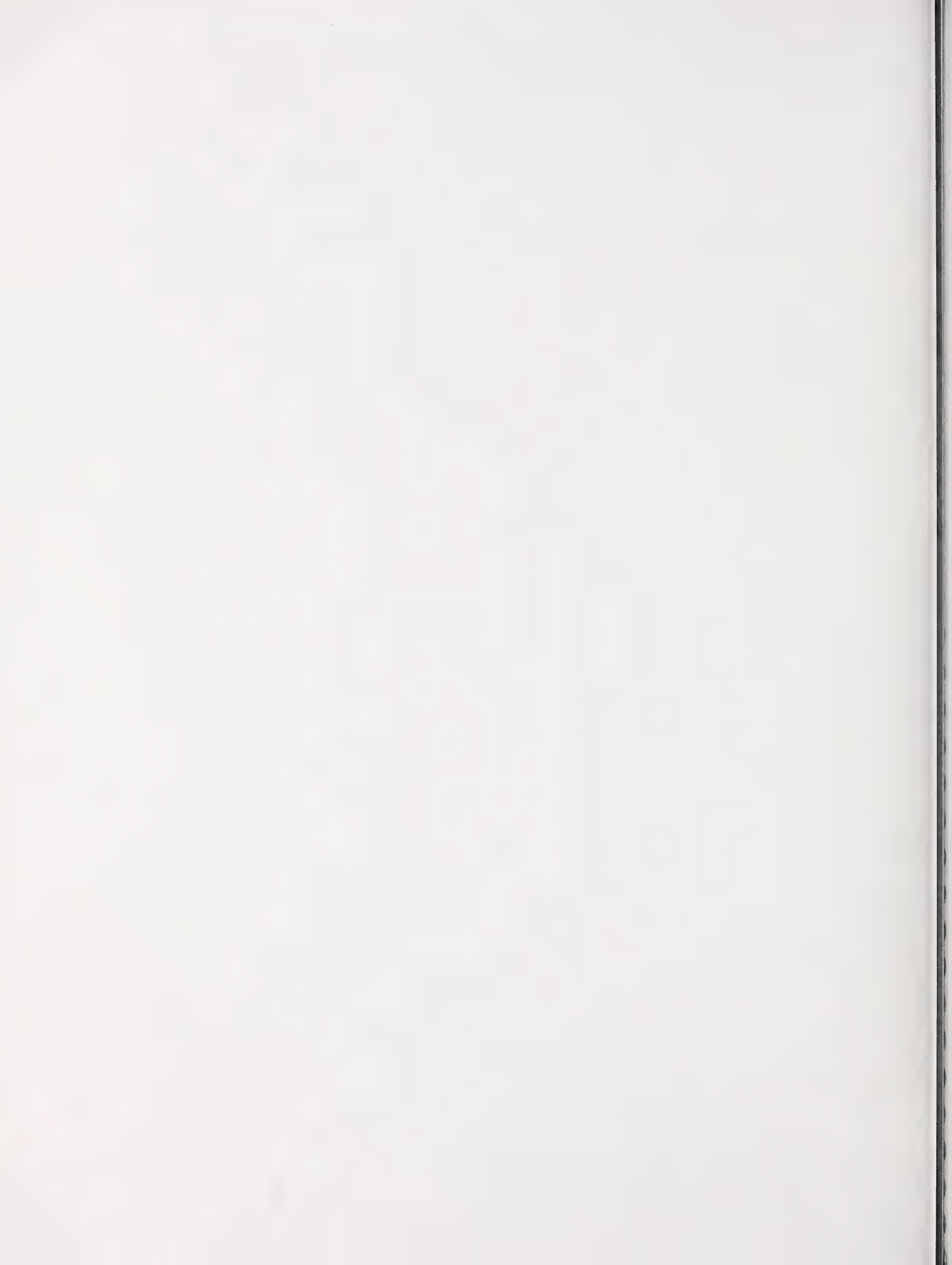
Day 13: Base Ten Mat #1 (continued)

Tens (10)

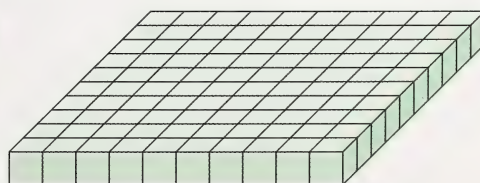
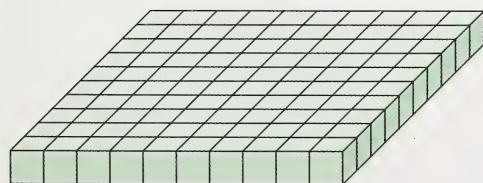
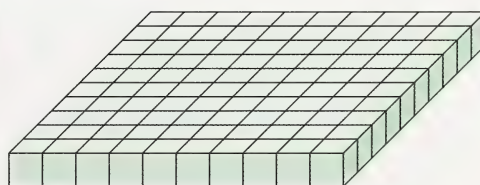
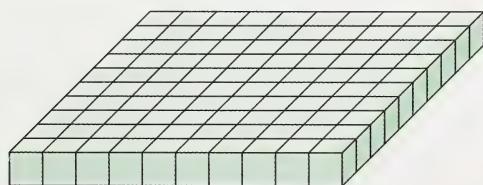
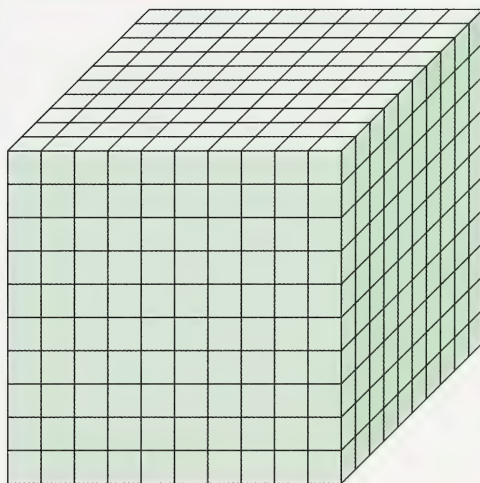
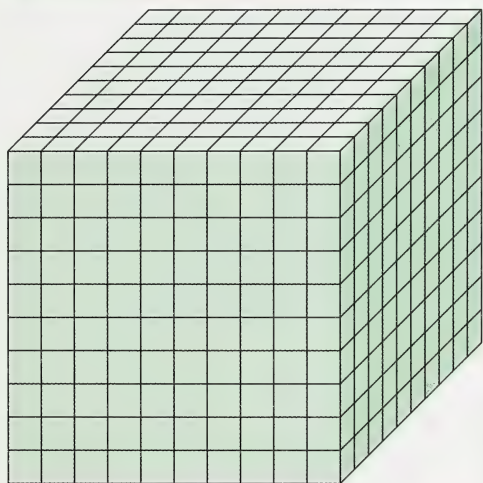
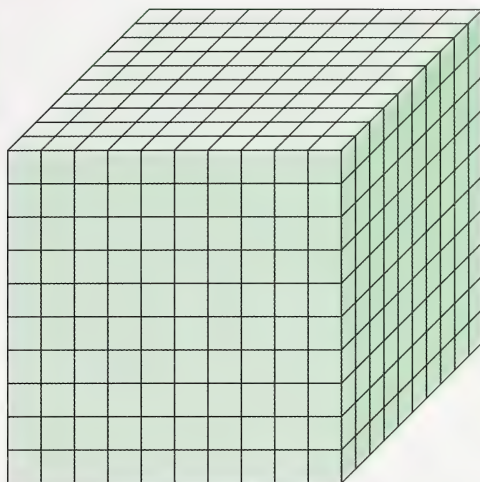
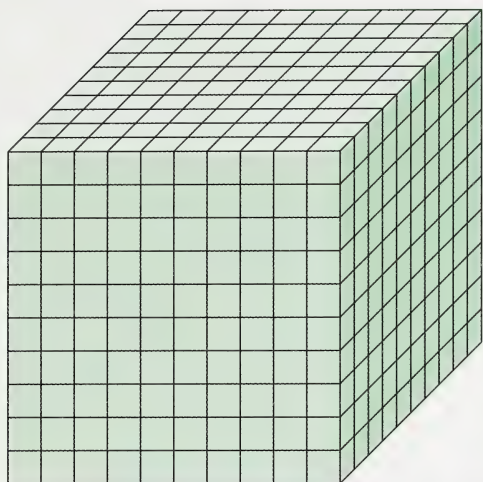
Ones (1)

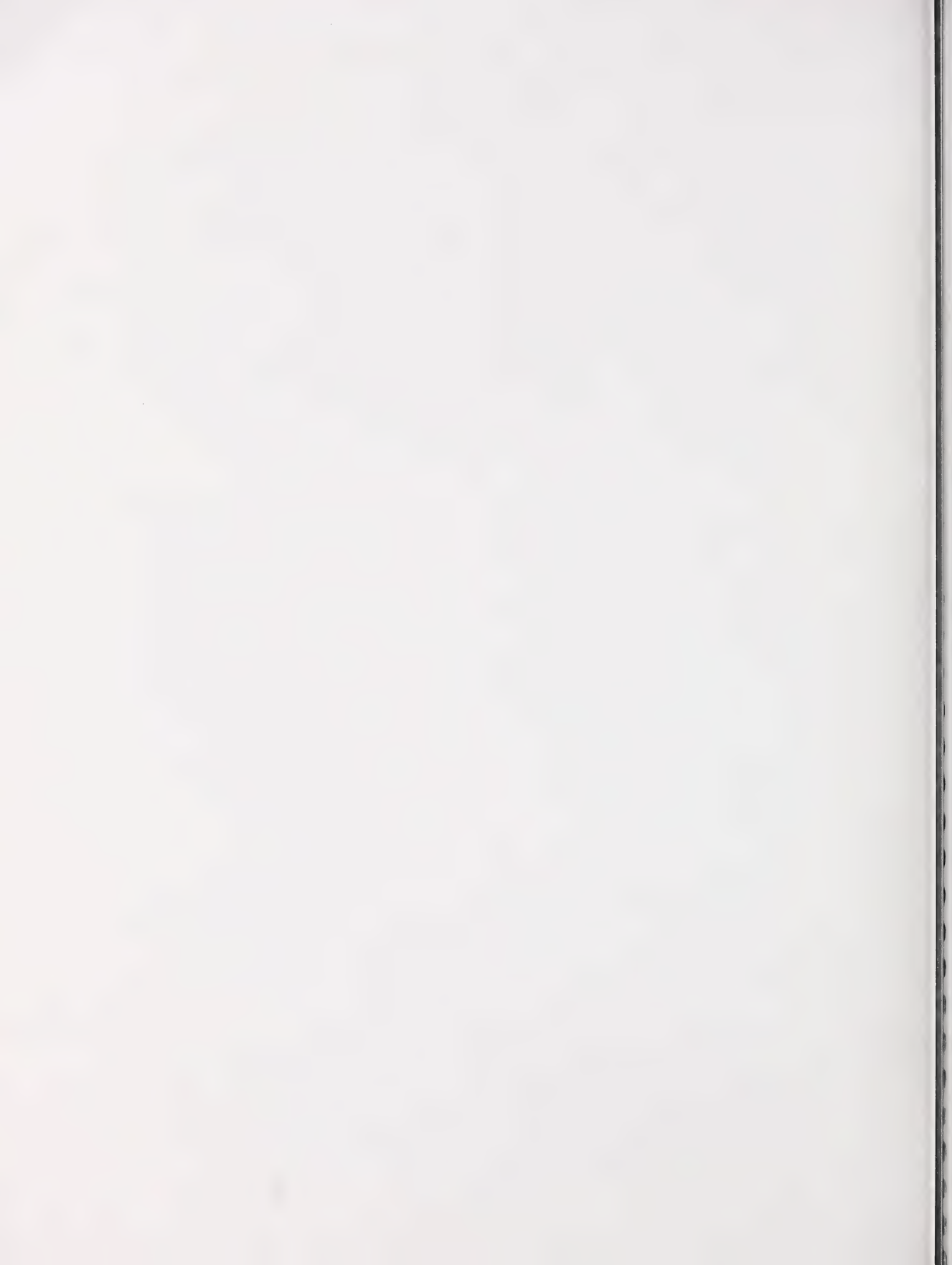
(Cut out this strip.)

TEN MAT

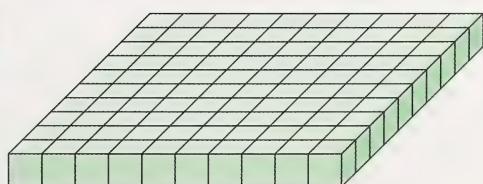
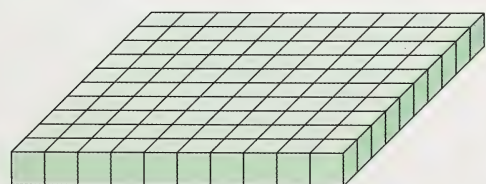
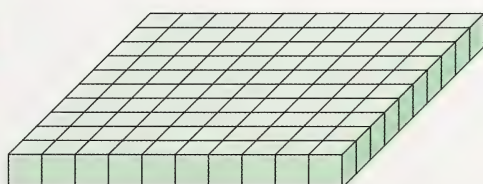
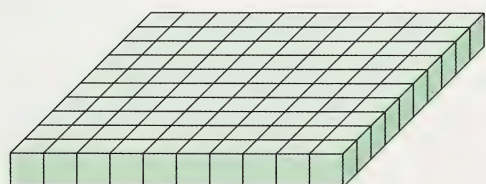
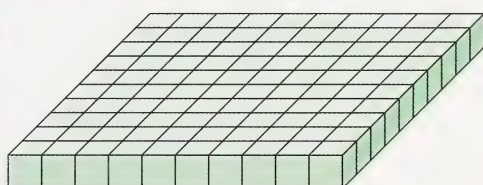
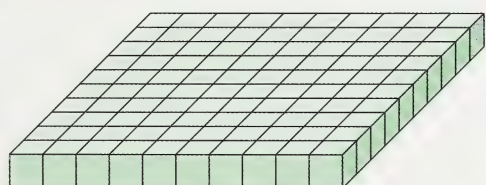
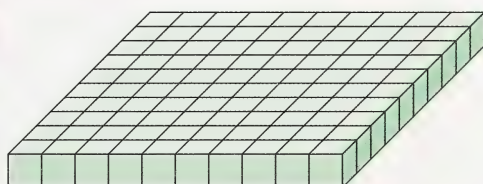
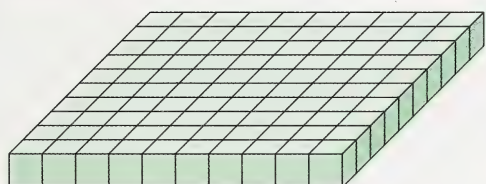
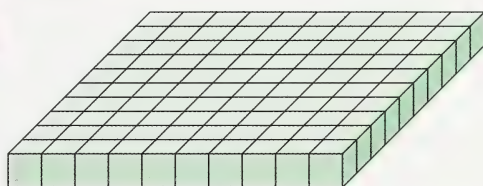
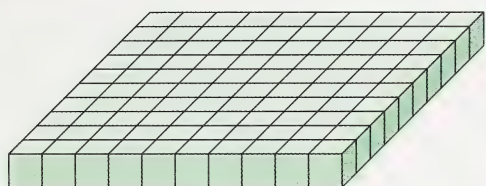
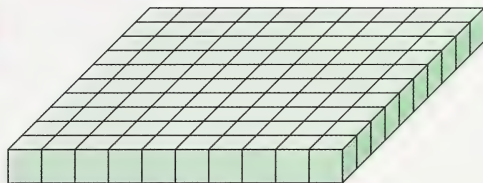
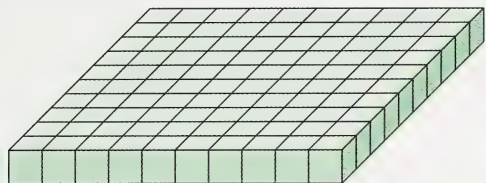
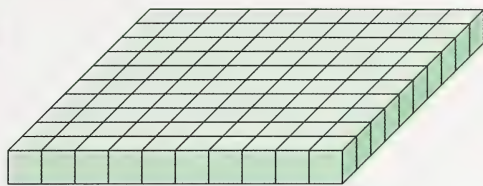
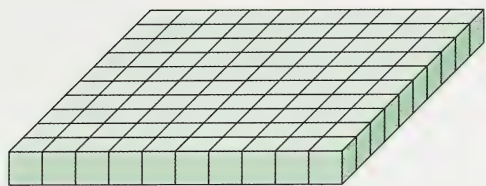


Day 16: Base Ten Blocks





Day 16: Base Ten Blocks (continued)



Day 16: Base Ten Mat #2

Thousands
(1000)

Hundreds
(100)

(Cut on this strip.)

↑ (Glue or tape second page here) ↓

BASE T

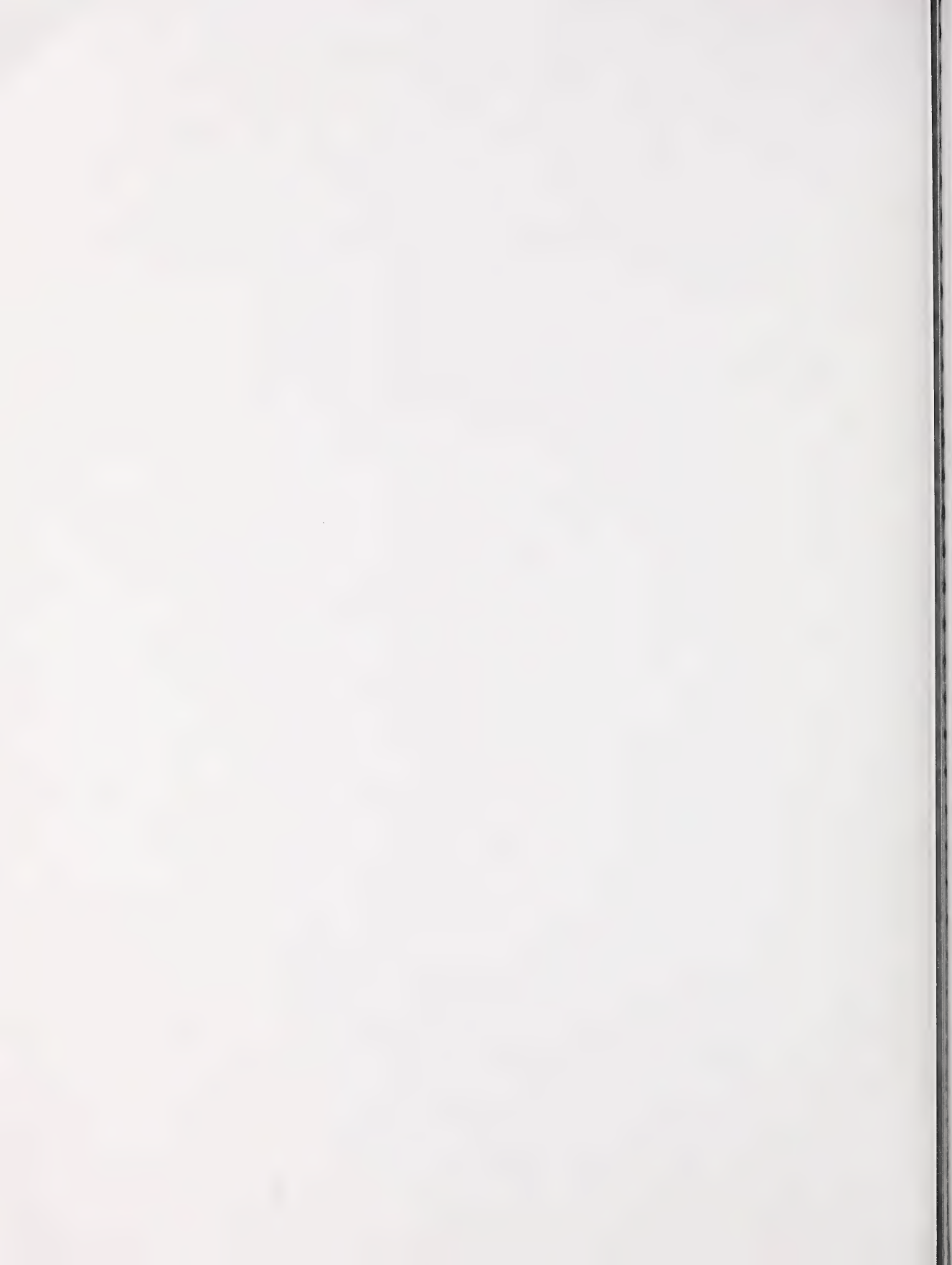
Day 16: Base Ten Mat #2 (continued)

Tens
(10)

Ones
(1)

(Cut on this strip.)

TENS MAT



Your Score

Number Facts Progress Chart for Module 5

25									
20									
15									
10									
5									



Day 2

Day 5

Day 7

Day 9

Day 12

Day 14

Day 15

Day 18

